

THE INFLUENCE OF UNITY AND PROTOTYPICALITY ON
AESTHETIC RESPONSES TO NEW PRODUCT DESIGNS

By

ROBERT W. VERYZER, JR.

A DISSERTATION PRESENTED TO THE GRADUATE SCHOOL
OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

UNIVERSITY OF FLORIDA

1993

Copyright 1993

by

Robert W. Veryzer, Jr.

ACKNOWLEDGEMENTS

A number of people deserve credit for their role in helping me to accomplish the goal of finishing this dissertation. First and foremost is Dr. J. Wesley Hutchinson, the chairman of my committee, to whom I am extremely grateful. The time and effort that he has contributed to this endeavor are greatly appreciated. This work would not have been possible without his benevolent guidance.

I am very grateful to Dr. Richard Lutz, Dr. Chris Janiszewski, and Dr. David Mick for their guidance in refining my ideas and for the encouragement that they have given me. I would also like to thank Dr. John Lynch, Jr. for his guidance on the statistical analyses and Dr. Jonathan Hamilton for contributing an economist's point of view.

I am indebted to my parents, Robert and Marion Veryzer, for their love and support, and for always being there when I need them.

Finally, I would like to thank my brother David who has been a tremendous source of inspiration to me.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	iii
ABSTRACT	vi
CHAPTERS	
I INTRODUCTION	1
II CONCEPTUAL BACKGROUND ON THE FACTORS THAT INFLUENCE AESTHETIC RESPONSES	6
Introduction	6
Factors Affecting Aesthetic Responses	9
Visual Organization Principles	9
Prototypicality	14
Derived Responses	21
III EXPERIMENT 1	28
Overview	28
Stimuli	28
Experimental Design	39
Experimental Procedure	40
Results and Discussion	41
Summary	81
IV EXPERIMENT 2	84
Overview	84
Experimental Design	84
Experimental Procedure	86
Results and Discussion	87
Summary	101
V EXPERIMENT 3	104
Overview	104
Stimulus Materials	105
Experimental Design	106

Experimental Procedure	108
Results and Discussion	108
Summary	114
VI GENERAL DISCUSSION	116
APPENDICES	
A LIST OF PRODUCTS EXPLORED FOR USE AS STIMULI	127
B STIMULUS SETS	129
C DIAGRAM OF EXPERIMENT 1	157
D DIAGRAM OF EXPERIMENT 2	159
E STRONG AND WEAK PRODUCT DESCRIPTIONS	161
REFERENCE LIST	164
BIOGRAPHICAL SKETCH	171

Abstract of Dissertation Presented to the Graduate School
of the University of Florida in Partial Fulfillment of the
Requirements for the Degree of Doctor of Philosophy

THE INFLUENCE OF UNITY AND PROTOTYPICALITY ON
AESTHETIC RESPONSES TO NEW PRODUCT DESIGNS

By

Robert W. Veryzer, Jr.

August 1993

Chairman: Dr. J. Wesley Hutchinson
Major Department: Marketing

This dissertation investigates the influence of the aesthetic aspects of product appearance on consumers' product preferences and product evaluations. Two factors, unity and prototypicality, are identified and discussed as being the principal factors that influence consumers' aesthetic responses to product designs. The research provides a basis for a theory of consumer aesthetics and has implications for new product development, product quality, and marketing strategy.

The dissertation postulates that consumers' responses to product designs are influenced by the design's consistency with the visual organization principle of unity (i. e., a congruity among the elements of a design) and its level of prototypicality (i. e., familiarity; shared features with the category

schema). Furthermore, it is suggested that aesthetic responses influence consumers' attitudes toward products, perceptions of product quality, and price expectations.

Three experiments are conducted in order to examine the role of unity and prototypicality in influencing aesthetic responses and product perceptions. The first study examines the relationship between the two factors (i. e., unity and prototypicality) and consumers' responses to product designs. This study provides evidence that there is a positive effect of unity on aesthetic response and that the favorable aesthetic response generated by consistency with the unity principle also influences "non-aesthetic" product perceptions. The study also finds that the unity factor provides a better explanation of aesthetic response than does prototypicality.

The second and third experiments examine whether or not the context of the evaluation situation (i. e., presence of other similar products, written product descriptions) moderates the influence of unity. These studies find that even though the evaluation context can reduce the magnitude of the unity effect, the unity effect is quite robust and is pervasive.

Taken together, the results of the three experiments indicate that the unity visual organization principle is a very important design factor and that aesthetic responses can have a significant impact on consumers' responses to product designs. The results highlight the relationship between product aesthetics (i. e., design) and consumer behavior.

CHAPTER I INTRODUCTION

There is a growing recognition that product design, and particularly aesthetic aspects of product design, is emerging as a key marketing element (Kotler and Rath 1984). Throughout the 1980s companies updated their manufacturing methods, quality control, distribution networks, customer service, and labor/management relations in order to compete with other foreign and domestic manufacturers. Today, as more and more manufacturers are able to achieve similar levels of price, quality, reliability, and technology, product appearance is increasingly being acknowledged as the major difference around which consumers can exercise a choice (Oakley 1990, p. 4).

Product design, or "competitive aesthetics" as it has been called (Reed 1990), is gaining recognition as a strategic activity that companies can use to gain a sustainable competitive advantage (Kotler and Rath 1984; Whitney 1988). It is being used for every sort of product from Apple computers to La Croix sparkling water cans. As Bruce Nussbaum pointed out in Business Week (June 17, 1991, p. 62): "Recently, business has grown increasingly aware that design sells. U. S. Companies, in particular, are rediscovering that good design translates into quality products, greater market share, and heftier profits." Although the technical aspects of products remain vitally important,

more and more manufacturers of all kinds of products are having to come to terms with the reality that product appearance is often the major factor influencing (consciously or unconsciously) what people buy and how much they are willing to pay (Oakley 1990, p. 5).

The influence of aesthetic factors on product preferences and perceptions is an important but often neglected area of study in consumer research. The design of products inherently involves aesthetics. The aesthetic aspects of a product give rise to the registering of affect or pleasure due to the conscious or unconscious influences of the characteristics of the product (Holbrook and Zirlin 1985). The response arising from the interaction between the aesthetic aspects of an object and the perceiver of the object has been termed the "aesthetic response" (Olson 1981). There is a growing recognition among marketing researchers that aesthetic responses can significantly affect consumer behavior and thus aesthetics is gaining recognition as an important marketing variable (Kotler and Rath 1984; Wallendorf 1980). The influence of aesthetics is increasingly being acknowledged as an important part of new product development (Whitney 1988), marketing strategy (Kotler and Rath 1984), product quality (Garvin 1984; Zeithaml 1988), product differentiation (Dickson and Ginter 1987), and competitive advantage (Holt 1985; Kotler and Rath 1984).

Despite the growing awareness of the significant influence that the aesthetic aspects of products can have on product preferences and perceptions,

surprisingly little in the way of design/aesthetic theory has been offered that aids in our understanding of how aesthetic responses are formed (Berlyne 1974, p. 5; Gorski 1987, p. 68; Holbrook and Zirlin 1985; Pye 1978, p. 88). Even though disciplines concerned with basic research such as experimental aesthetics remain dormant or in a "protracted infancy" (Berlyne 1971), other disciplines such as industrial (product) design look to them to address the lack of design theory (Gorski 1987, p. 68). The end result is that managers continue to exhibit much "unease" when it comes to making decisions about design and managing design projects (Oakley 1990, p. 7). This is particularly problematic for managers charged with transferring new technology out of the laboratory and into the market. It is at this point that the appearance of a product plays a crucial role in communicating the products identity and use to consumers.

Although consumer research seems to be ideally suited for the study of aesthetic response due to its unique combination of scientific research methods and its tangible research context (i. e., consumer product focus), consumer researchers have taken only tentative steps toward exploring aesthetics and its relationship to consumers' behavior. Much of this work has been concerned with debating the definition and scope of consumer aesthetics rather than examining the nature and influence of aesthetics and aesthetic responses (Holbrook and Zirlin 1985). Thus, aesthetic research has proceeded without the benefit of a conceptual foundation (Holbrook and Zirlin 1985; Olson 1981).

Consumer researchers have not developed one, and they have not found one in any of the other disciplines to adopt as a starting point for building aesthetic theory.

This dissertation attempts to address this void in aesthetic theory by examining the influence of the aesthetic aspects of product appearance on consumers' product preferences and perceptions. This research represents important steps toward understanding the implications of aesthetics and product design for consumer research and the formulation of a theory of consumer aesthetics.

In Chapter II the two principal factors, unity and prototypicality, that influence consumers' aesthetic responses to a product's design are discussed and the supporting research is reviewed. Several hypotheses are developed that involve the relationship of the factors to aesthetic and derived responses.

Chapters III and IV each present the method and results of an experiment designed to investigate the influence of the unity and prototypicality factors on aesthetic and derived responses. Chapter III also includes a detailed discussion of how the stimuli employed in all of the experiments were developed.

Chapter V presents the method and results of an experiment that focuses on derived responses.

Chapter VI provides a general discussion of the findings and implications of these results for research that examines the influence of

product aesthetics on consumer behavior. The managerial implications of these findings are also discussed.

CHAPTER II
CONCEPTUAL BACKGROUND ON THE FACTORS THAT INFLUENCE
AESTHETIC RESPONSES

Introduction

Even though there is a growing awareness of the important role that aesthetics play in influencing product preferences, our understanding of aesthetic responses is extremely limited. Our primitive understanding of aesthetic response phenomena may be due to the highly fragmented approach that has characterized its study. Aesthetics have been studied in a number of fields including philosophy, art history, psychology, experimental aesthetics, industrial design, and more recently consumer behavior. Each field has contributed to our comprehension of aesthetics and yet, little progress has been made in understanding the specifics of aesthetic response (Berkowitz 1987; Wohlwill 1981). Within the many conceptualizations of aesthetic response that have emerged from these different fields of study, there is little agreement and limited insight regarding why a particular object is perceived as pleasurable or beautiful while another is viewed as unattractive. The question concerning what makes an object aesthetically pleasing, regardless of whether it is a painting or a portable stereo, has received diverse and typically vague answers from the disciplines that have studied it. While a lack of convergence is not

uncommon in interdisciplinary research, the different orientations of the disciplines that are or have been concerned with aesthetic phenomena and the vagueness of the theories that have been offered to explain aesthetic responses have severely inhibited progress toward gaining an understanding of aesthetic responses.

Some aesthetic response theories, which seem to view aesthetic response as idiosyncratic, maintain that there are no laws or principles of aesthetics (Mothersill 1989), while others suggest that inner tendencies of the visual system result in laws that govern perception and thereby influence aesthetic response (Katz 1950; Koffka 1935). There are aesthetic theories that point to fashion trends or the influence of culture as the determinant of systematic aesthetic responses for all classes of products (Pleydell-Pearce 1970; Sproles 1981). There are views of aesthetic response that would suggest that the consumer's preference for a specific product was determined by a desire for unity in variety (Auld 1981; Berlyne 1971; Lauer 1979). Other views maintain that preference is related to prototypicality (Loiken and Ward 1990; Nedungadi and Hutchinson 1985). There are also those that periodically suggest that the term "aesthetic response" applies only to works of art (Holbrook 1981), only to be contradicted by those who maintain that all objects have an aesthetic component (Berlyne 1974; Wallendorf 1980). Even the artists and product designers who determine the forms of the objects seem to have trouble agreeing on the basics of design (Lauer 1979) and as yet "have not formulated

what they know" (Pye 1978, p. 11). In fact, the well worn maxim that "form follows function" has even been challenged (Lewalski 1988; Pye 1978). Interestingly enough, designers are beginning to look to the disciplines of experimental psychology and consumer behavior in order to understand the cognitive condition of design (Zaff 1987).

The lack of understanding concerning what makes an object aesthetically pleasing is particularly evident in the area of new product development. The issue of aesthetic response and the factors that influence it are frequently overlooked in many discussions of the new product development process. Much of the work in this area seems to sidestep these considerations by either ignoring the role of industrial design (i. e., the process of shaping or giving form to goods that are to be mass produced) in the new product development process or subsuming the industrial design function under the engineering function (e. g., Gruenwald 1985; Urban and Hauser 1993). In either case, the result is that the role of product appearance in the success of a new product is not explicitly acknowledged or addressed. Given the increasing importance of product aesthetics this omission is a rather serious deficiency. Fortunately, the distinct role of industrial design and its relationship to the engineering and marketing functions is beginning to receive the attention that it merits (e. g., Lorenz 1986). However, most of the work that addresses the role of industrial design in the new product development

process stops short of identifying and investigating the factors that influence aesthetic responses to products.

Factors Affecting Aesthetic Response

Aesthetic response is a complex phenomenon that is not yet well understood. As with any complex phenomenon it is likely to involve a number of factors; however, prior research seems to suggest that there are two principal factors: the visual organization principle of unity and prototypicality, that may significantly influence aesthetic responses. Some of the significant prior research that suggests that these factors may play an important role in influencing aesthetic responses will now be reviewed. The influence of aesthetics/aesthetic response on non-aesthetic perceptions (i. e., derived responses) will also be discussed.

Visual Organization Principles

The greatest void in aesthetic theory and research (and the greatest opportunity) concerns the identification of specific factors that systematically influence aesthetic responses. Although very general "rules" or "principles" have sometimes been offered (e. g., "unity in variety" -- Hutcheson 1725), the rules are usually vague and unspecified. Even though aestheticians seem to rely on principles such as "unity" and "balance" and aesthetics research has frequently employed scales that attempt to measure dimensions such as

disorderly/orderly, weak/powerful, somber/bright, etc. as they pertain to aesthetic stimuli (e. g., paintings), the specific contributions of these dimensions to aesthetic response are not yet well understood. Although principles such as "unity" and "balance" may be understood in terms of visual organization principles such as the Gestalt laws of perception (Lewalski 1988; Pickford 1972, p. 31), no reported research has been found that relates Gestalt laws to general rules regarding aesthetic responses (see Veryzer 1993 for an exception).

Unity

Design Principles such as "unity" describe perceived spatial relations between the parts of a visual display. The design principle of unity refers to a congruity among the elements of a design such that they look as though they belong together or as though there is some visual connection beyond mere chance that has caused them to come together (Lauer 1979). The tendency to perceive groupings of constitutive elements in certain ways or as integrated entities is an important aspect of perception. These tendencies are described by Gestalt laws (Koffka 1935) and design principles (Ching 1979; Lauer 1979). Although design principles are more general than the Gestalt laws of perception, the two sets of rules of perception are related and in some instances a set of Gestalt laws may be used to describe a design principle. For example, the Gestalt laws of proximity (i. e., elements that are closest to each

other tend to form groups), similarity (i. e., elements that are similar tend to form groups), and common destiny (i. e., parts of a figure that have a common destiny tend to form units) may be viewed as ways to achieve unity (Katz 1950; Lauer 1979). According to the Gestalt psychologists beauty is dependent on the degree to which an object displays relations consistent with the Gestalt laws of organization. Koffka (1935) clearly suggested this when he discussed how violations of such laws as "good continuation" and "good shape" are not only felt as violations, they conflict with our feeling of "fit" and "hurt our sense of beauty" (Koffka 1935, p. 175).

Although the visual organization principle of unity would seem to be a likely factor in influencing aesthetic responses, there is little in the way of research that relates visual organization principles (e.g., design principles, Gestalt laws) such as unity to aesthetic responses. There is, however, a limited amount of research that indicates that there are general guidelines or principles for combining visual elements in order to maximize aesthetic responses. A study by Bell, Holbrook, and Solomon (1991), which examined the impact of gestalt-like ensemble effects and the influence of personality factors on product evaluations, provides support for the view that unity may systematically influence aesthetic responses. In their study, subjects were asked to look at one of thirty-two color photographs containing various combinations of traditional and contemporary styles of five types of living-room furniture--specifically, a chair, a table, a piece of sculpture, a floor lamp, and

a framed picture (each photograph contained all five types of living-room furniture but differed with respect to the mix of traditional and contemporary styles). Subjects rated the furniture in the randomly assigned photo in terms of perceived unity (i.e., a visual connection among elements that suggests that something beyond mere chance has caused them to come together), aesthetic response, social impression, general liking, and intention to own. Subjects also provided ratings on a number of items which measured personality and motivation variables. Bell et al. (1991), found that aesthetic response did, in fact, depend on perceived unity ($R^2 = .05$, $p < .001$) and that perceived unity depended on the product styles ($R^2 = .19$, $p < .001$ - with significant contributions of chair, table, and ensemble). These findings suggest that the principle of unity, which was operationalized in this study as the mix of the two styles shown in each photograph, does seem to influence aesthetic response.

The influence of unity has also been examined in the context of social information processing studies. For example, Lennon (1990) investigated the effects of clothing attractiveness on perceptions. In order to determine the degree to which people perceive others differentially as a function of the attractiveness of their clothing, slides of six different models in business attire, three wearing attractive clothing and three wearing unattractive clothing, were prepared. In the unattractive clothing condition, models wore garments and accessories that did not match either in color, style, or pattern. In the

attractive clothing condition, models wore clothing that was well matched and wore accessories to complement their clothing (two pilot studies were conducted to get a consensus regarding clothing attractiveness). Fifty-eight female subjects listened to a pre-recorded audio tape consisting of thirty suggestions relative to marketing a perfume. As a comment was heard, a slide of the woman purported to have made the comment was projected. Subjects rated the women on competence, work comfort (a measure of the extent to which the respondent would feel comfortable working with the woman shown), and sociability. A repeated measures analysis of variance revealed that there was a main effect for clothing attractiveness on perceived competence ($F(1,58) = 52.14, p = .000$). Models dressed in attractive clothing ($M = 55.15$) were perceived to be more competent than models dressed in unattractive clothing ($M = 46.49$). There was also a main effect for clothing attractiveness on perceived work comfort ($F(1,58) = 24.18, p = .000$). Respondents indicated that they would feel more comfortable working with attractively dressed models ($M = 22.02$) than with unattractively dressed models ($M = 19.10$). Finally, there was a main effect for clothing attractiveness on perceived sociability ($F(1,58) = 5.28, p = .025$). Attractively dressed models ($M = 11.41$) were perceived to be more sociable than those models who were unattractively dressed (mean = 10.86). These results provide further support for the view that configurations of aesthetic elements (i. e., visual organization rules such as unity, color

harmony, repetition, etc.) can significantly influence perceptions. The preceding discussion suggests the following hypothesis:

H1: Aesthetic responses are more positive for objects (products) exhibiting high consistency with the visual organization principle of unity than they are for objects (products) that are not consistent with this visual organization principle.

Prototypicality

Another factor that seems to exert an influence on aesthetic response is that of experience. Familiarity has been shown to lead to positive affect (Kunst-Wilson and Zajonc 1980). This would seem to suggest that more typical or familiar items should be better liked (Loken and Ward 1990). Typicality, or prototypicality, is concerned with the degree to which an object is representative of a category. A prototype can be defined as the central representation of a category, as possessing the average or mean value of the attributes of that category and as representing the averaged members of the class (Langlois and Roggman 1990; Rosch 1978). According to the prototypicality view, people respond most favorably to objects that are highly prototypical and less favorably to objects that are less prototypical (Glass and Holyoak 1986, p. 170; Langlois and Roggman 1990). The prototypicality explanation of preference maintains that more prototypical examples tend to be better liked (Loken and Ward 1990; Nedungadi and Hutchinson 1985). Although prototypi-

cality theories were not developed to specifically address aesthetic issues, the absence of a theory of aesthetic response has led consumer researchers as well as others to rely on prototypicality as a default theory for explaining aesthetic response.

A number of explanations have been suggested for the relationship between prototypicality and preference. One explanation for the relationship between prototypicality and preference/attitude suggests that more prototypical items are more familiar and therefore better liked. Familiarity refers to either an item's meaningfulness (i. e., perceived knowledge about an item) or the frequency of exposure to the item (Loken and Ward 1990). Another explanation suggests that more prototypical category members are preferred because they have more valued attributes. This explanation does not hold that prototypically per se leads to product preference, but rather maintains that as product categories evolve one or a few products tend to become market-share leaders because they have attributes widely desired by consumers who buy the product. Competitive brands are designed to appeal to the same segment(s) of consumers so they are similar in many ways to market leaders (Loken and Ward 1990). It has also been suggested that the link between prototypicality and preference may in part be due to the information theory notion of redundancy in that prototypes appear to be just those members of a category that most reflect the "redundancy structure" of the category as a whole (Rosch 1978, p. 37). The preceding discussion suggests the following hypothesis:

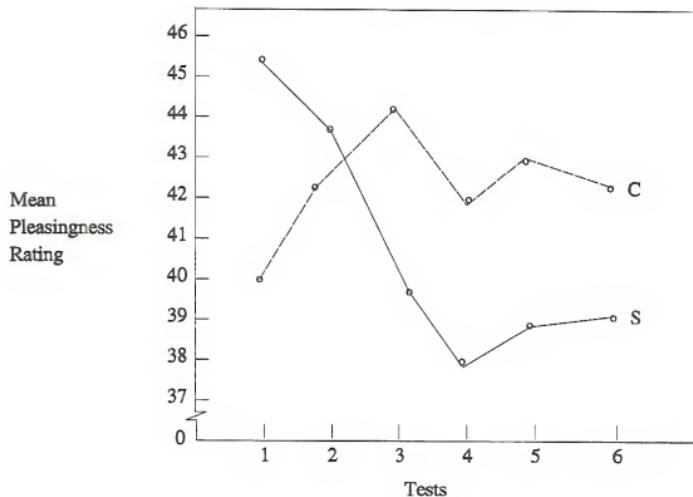
H2: Objects (products) that are more prototypical (i. e., have more shared features with the category schema) will receive more favorable aesthetic responses than objects that are less prototypical (i. e., fewer shared features with the category schema).

Although prototypicality/familiarity seems to provide a satisfactory explanation of aesthetic response in some cases (e. g., Kunst-Wilson and Zajonc 1980; Loken and Ward 1990), such an explanation does not seem adequate in others (e. g., Meyers-Levy and Tybout 1989). In fact, in some cases it is the converse of prototypicality (i. e., novelty, distinctiveness) that seems to account for positive aesthetic response (Woll and Graesser 1982). Some research that examined novelty and complexity may provide insight into this apparent inconsistency. In a study that examined novelty ratings of simple and complex shapes, Eisenman (1968) found that more complex polygons (i. e., those with more sides) were rated as being more novel. In a related study, Berlyne (1970) examined the effect of repeated presentation on hedonic value for simple and complex (i. e., novel) patterns. Berlyne had subjects rate two simple and two complex patterns six times on a 7-point pleasingness scale. Between consecutive tests the subjects saw each of the patterns eight times without having to record a judgement. The results confirmed that ratings of complex (i. e., novel) patterns rose and then fell after reaching a maximum at the third test. Ratings of the simple (i. e., less novel) patterns, which were initially

higher than those for the more complex (novel) patterns, fell throughout the tests until they finally flattened out (see Figure II - 1). This would seem to explain why (and roughly when) prototypicality will be liked better in some cases and novelty will be better liked in others.

Mandler (1982) has theorized that the level of congruity between a product and a more general product category schema may influence the nature of information processing and thus product evaluations. Products that are moderately incongruent with their associated category schemas are said to stimulate processing that leads to a more favorable evaluation relative to products that are either congruent or extremely incongruent with the category schema. Mandler suggests that moderate incongruities are those that can be successfully and readily resolved by the processor.

Meyers-Levy and Tybout (1989) conducted a series of experiments to test Mandler's schema (in)congruity hypothesis. The general method, which was modified slightly over the course of the three studies that were conducted, consisted of presenting subjects with descriptions and samples of beverage/soft drink products and having them evaluate the products along dimensions such as appeal, taste, quality, interest in trial, etc. In their design, schema congruity and schema incongruity were manipulated by varying a single attribute in the product description (high preservatives vs. all natural ingredients) so as to alter the structural and descriptive congruence of the product description with the schema activated by the category label (beverage



Mean pleasingness ratings for complex (C) and simple (S) patterns in successive test. Consecutive tests were separated by eight presentations of each pattern. (Source: Berlyne 1970)

FIGURE II - 1
BERLYNE'S EXPERIMENTAL RESULTS

vs. soft drink) that was specified in the first sentence of the product description (e. g., subjects were told that they were going to be evaluating either a new "beverage" or a new "soft drink" and later they were told that the product had either "high preservatives" or had "all natural ingredients"). Across their three experiments Meyers-Levy and Tybout found support for Mandler's view that the process of responding to levels of schema congruity influences evaluations, and that moderate schema incongruity enhances evaluations. Moderate schema incongruity led to more favorable evaluations than either schema congruity or extreme schema incongruity. This discussion suggests the following hypotheses:

H3: Moderate schema incongruity (i. e., distinctiveness, novelty)
leads to a more favorable aesthetic response than does complete
congruity between a product and its product class (i. e.,
prototypicality).

H4: Moderate schema incongruity leads to more favorable
aesthetic responses than does extreme schema incongruity.

It is also possible that people may prefer more novel products due to variety seeking (Holbrook and Hirschman 1982) or perhaps because of a product's salience relative to other products (Loiken and Ward 1990; Woll and Graesser 1982).

H5: Objects (products) that are more novel (i. e., atypical) will receive more favorable aesthetic response ratings than objects that are less novel (i. e., more prototypical).

These hypotheses would predict that a product that exhibits a singular change from the category prototype should receive more positive aesthetic ratings than either the category prototype or a product that exhibits multiple changes (i. e., extreme schema incongruity). While this result might be expected if familiarity is entirely a function of memory, it is possible that the unity design factor may influence feelings of "perceived familiarity." In an instance where two attributes of a stimulus were altered such that the stimulus was no longer prototypical but it did exhibit unity, the relational similarity (i. e., unity) to the category prototype may generate a sense of "perceived" familiarity (Goldstone, Medin, and Gentner 1991). This discussion suggests the following hypothesis:

H6: Consistency with the visual organization principle of unity is positively related to perceived familiarity.

In addition to the hypotheses that have already been presented concerning the influence of specific factors on aesthetic response, there are several other important hypotheses concerning the influence of the aesthetic responses that are fostered by these factors. These hypotheses are developed and presented in the section that follows.

Derived ResponsesAttitude

Aesthetic responses seem to influence derived responses (i. e., non-aesthetic evaluations) although their influence is often attributed to other factors (e. g., Berkowitz 1987). One area that seems to be influenced by aesthetic responses is that of attitude. Bell et al. (1991) have suggested that aesthetic responses are key determinants of general liking. In their study, which was described earlier, they found evidence that general liking was influenced by aesthetic response (recall that aesthetic response in their study was influenced by perceived unity which was manipulated by means of the ensemble that was depicted).

In general, "attitudes" may be conceptualized as evaluative judgements. The term is usually used to refer to an individual's disposition to respond favorably or unfavorably to an object, person, institution, or event, or to any other discriminable aspect of an individual's world (Ajzen 1989, p. 241). Ajzen (1989) has noted that affective reactions may feed into the overall evaluative response to an attitude object and thus may be at least partly responsible for the evaluative direction and intensity of a person's beliefs.

The influence of affect due to aesthetic factors (i. e., happy or angry looking faces, taste, smell) on attitude formation and change was examined in a study by Edwards (1990). In two experiments, Edwards examined the hypotheses that the sequence of affect and cognition in an attitude's formation

is an important determinant of its subsequent resistance to affective and cognitive means of persuasion. Affect-based and cognition-based attitudes were induced and subsequently challenged by either affective or cognitive means of persuasion. The procedure used to create the two types of attitudes and the means of persuasion involved varying the sequence of affect and cognition while holding the content of communications constant. Edwards found that affect-based attitudes exhibited more change under affective means of persuasion than under cognitive means of persuasion. Cognition-based attitudes, on the other hand, exhibited equal change under both forms of persuasion. In addition, it was found that affect-based attitudes were expressed with greater confidence than their cognition-based counterparts. These findings demonstrate that aesthetic responses can play an important role in determining attitudes.

H7: Attitudes (e. g., general liking) towards products are more favorable for products receiving more positive aesthetic ratings than for products receiving less positive aesthetic ratings.

Perceived Quality

Another important area where aesthetic responses seem to play an important role in influencing non-aesthetic evaluations is that of product quality. Garvin (1984) has identified aesthetics as one of the eight dimensions of quality. Zeithaml (1988) has suggested that "intrinsic cues," which involve

the physical composition of the product (e. g., texture, color, flavor, etc.), are very important in signaling perceived quality to the consumer. In a study by Berkowitz (1987), consumers seemed to make unconscious inferences concerning freshness, taste, and quality based on the shapes of the products. Berkowitz examined consumer reaction to a food product -- frozen corn on the cob of two shapes (full ears with squared-off ends and full ears with untrimmed ends), in order to determine: (1) whether the shape of the product would influence preference; and (2) whether preference levels would vary with involvement and experience with the product category. The experimental design involved paired comparison tests at laboratory kitchens in enclosed malls and sequential monadic tests in subsequent home placements. Test panelists included 286 female homemakers of which 184 currently purchased the frozen variety of corn and 102 bought only the fresh variety. The findings showed a marked preference for the untrimmed shape. Preference ratios comparing preference scores for the rounded, untrimmed shape to those for the squared-off shape were:

- Laboratory test -- 1.1: 1 frozen users; 2.0: 1 fresh only
- Home placement -- 1.8: 1 frozen users; 2.2: 1 fresh only

The results were statistically significant at the .01 level. Nearly four out of five consumers said the reason for their choice in the home test was better taste, about half said the untrimmed was a more natural product, and half reported better texture. Visual appeal or a more pleasing shape, per se, were

very minor motivations. Ratings on ten attributes showed the basis of consumer preference in a more systematic way. Overall preference ratios were as follows: more like fresh -- 3.2; more natural -- 3.1; taste/flavor -- 2.3; quality -- 2.3; size -- 1.7; texture -- 1.5; shape -- 1.5; and appearance -- 1.1. Panelists did not misperceive criteria like ease of preparation (1.0) and ease of holding (.8) for which shape had objectively little impact.

Berkowitz suggests that the data seem to indicate a chain of interrelated inferences which stem from the shape of the product rather than a single direct linkage. He notes that the findings indicate that an attribute communicated and presumably noticed may not be considered by consumers to be discriminating, but the attribute(s) that it triggers may be considered to be discriminating. Thus, the squared-off shape of the one test item may have fostered an association (or cued categorization) with processing or processed products while the more natural looking product may have been associated with freshness or "fun experiences such as summer family barbecues when fresh corn was served" (Berkowitz 1987, p. 559). Berkowitz' notion of "interrelated inferences" is similar to the concepts of perceptual categorization and perceptual inferences (Wilkie 1990). Wilkie (1990) has pointed out how these processes, which translate sensory inputs into a mental "identification" of a particular stimulus and develop (i. e., construct) beliefs concerning the stimulus based on other information such as stimulus properties, lead to

consumer inferences and thus play a major role in directing consumer behavior (Wilkie 1990, p. 267).

Evidence for the influence of aesthetic response on quality and ability/performance evaluations can also be found in the social perception literature. Landy and Sigall (1974) found significant main effects for writer attractiveness on evaluations of a writer and her work. Similarly, Lennon (1990) found a significant effect of clothing attractiveness (clothing and accessories that matched vs. clothing and accessories that did not match in color, style or pattern) on perceived competence. The findings of these studies suggest that the aesthetic aspect of products (i. e., objects) and the aesthetic responses that they give rise to may exert an influence on non-aesthetic aspects of products such as quality.

H8: Quality ratings are higher for products that receive more positive aesthetic ratings than for products that receive less positive aesthetic ratings.

Price

The possibility that aesthetic response may influence perceived product quality raises some interesting questions with regard to the price-quality relationship. This relationship has been examined primarily in terms of price as cue to quality (Monroe 1973; Zeithaml 1988). Even though a positive price-perceived quality relationship does appear to exist, results of studies that have

examined the price-quality relationship have been somewhat mixed and the findings imply that price may not be the dominant cue in quality perception (Monroe 1977; Zeithaml 1988). Moreover, there seem to be cases where perceptions of (high) quality are formed without being diminished by (low) price and the quality perceptions subsequently influence price (e. g., the perceived quality of Japanese automobiles despite their initial low prices).

In cases where consumers initially do not have price information it seems likely that they might form impressions about a product based on non-price information (e. g., physical composition of the product, packaging, brand name, etc.) and that these impressions could influence price expectations. Thus, it is conceivable that the same design factors that influence aesthetic responses and thereby perceptions of product quality may also influence price expectations.

H9: Price expectations (ratings) are higher for products that receive more positive aesthetic ratings than for products that receive less positive aesthetic ratings.

Ultimately, the price expectations fostered by product design/aesthetics may play a role determining consumers' "price thresholds" (Monroe 1973) for a particular product within a category.

If indeed unity and prototypicality systematically influence aesthetic responses and these, in turn, influence product preferences and product

perceptions, then one would expect these design factors to influence the ratings of products in accordance with (the level of) their presence (or absence) in the products. Aesthetic responses would be expected to be more positive for objects (products) exhibiting high unity than they would for objects (products) that were not consistent with this visual organization principle. In general, prototypicality would be expected to lead to more favorable aesthetic responses than would atypicality; however, there is some question about the nature of this relationship with regard to the level of prototypicality (i. e., prototypical or moderately atypical) that maximizes positive aesthetic response. The unity and typicality factors would also be expected to influence non-aesthetic evaluations or derived responses such as attitude, perceived quality, and price expectations.

In the chapters that follow a series of three experiments that examine the hypotheses that have been presented here are discussed. Experiments 1 and 2 examine the influence of unity and prototypicality on aesthetic responses (i. e., H1, H2, H3, H4, and H5) and derived responses (i. e., H7, H8, and H9). The influence of unity on perceived familiarity is also examined (i. e., H6). Experiment 3 focuses on the influence of product aesthetics on the attitude and perceived quality derived responses (i. e., H7 and H8). In this experiment, additional information is presented during the evaluation task in order to examine whether or not the presence of the information moderates the influence of aesthetic response on the derived responses.

CHAPTER III EXPERIMENT 1

Overview

The hypotheses developed in Chapter II concern the role of design factors in influencing aesthetic and derived responses. It was hypothesized that aesthetic and derived responses would be more positive for products exhibiting high unity than they would be for products that were not consistent with the unity visual organization principle. It was also suggested that although there is some question about the level of prototypicality that maximizes positive aesthetic response, prototypicality, in general, would be expected to lead to more favorable aesthetic and derived responses. This chapter first discusses the stimuli and methodology that were used in Experiment 1 to examine these hypotheses. The analyses and results of Experiment 1 are then presented and discussed.

Stimuli

In order to examine the hypotheses concerning the influence of unity and prototypicality stimulus sets were created that allowed these factors to be manipulated independently. This discussion will first describe how these

manipulations were accomplished. The manipulations will then be related to the basic design employed in the experiment. This will be followed by a general discussion of how the stimulus products employed in this experiment were selected and developed.

Stimulus Manipulations

The stimulus sets (i. e., design sets) were constructed by first selecting a prototypical product (i. e., product form) from a product category. Two prominent parts of the prototypical product were then selected for manipulation. Three variations of the prototypical product were then produced by altering either one or the other of the two selected features or both features. This produced a stimulus set consisting of four product variations (i. e., the original prototypical product variation, two variations that contained one altered feature, and one variation in which both features had been altered). The two product variations that shared one of the selected features with the prototypical variation (i. e., only one feature had been altered) were moderately atypical products. The product variation that did not share either of the two selected features with the prototype (i. e., both features had been altered) was the most atypical product of the set. Thus, within the stimulus set of four products three levels of prototypicality were represented (i. e., prototypical, moderately atypical, and extremely atypical).

The transformation of the two product features was done in a way that also manipulated each product variation's consistency with the unity visual organization principle. In the case of the prototypical variation the two selected features displayed a visual connection with each other (e. g., a repetition of the same shape). When one of the two selected features was altered it was done in a way that decreased unity (e. g., did not display a visual connection with other parts of the product) and therefore decreased the unity exhibited by the product variation. This was the case for each of the variations in which only one feature had been altered (i. e., the moderately atypical variations). In the case of the product variation where both features were altered unity was again achieved since the altered features displayed a visual connection to each other even though the features were very different from the features of the prototypical variation. Thus, changes in the two selected product features resulted in two levels of unity (unified and un-unified), and three levels of prototypicality (prototypical, moderately atypical, extremely atypical).

An example of how unity and prototypicality were manipulated by transforming two of a product's features is shown in Figure III-1. In this example two features of a telephone (handset and base) are altered using the shape transformation in order to make the product either more or less prototypical and more or less unified. The upper left-hand cell of the figure contains the most prototypical (++) form of the product. The prototypicality of

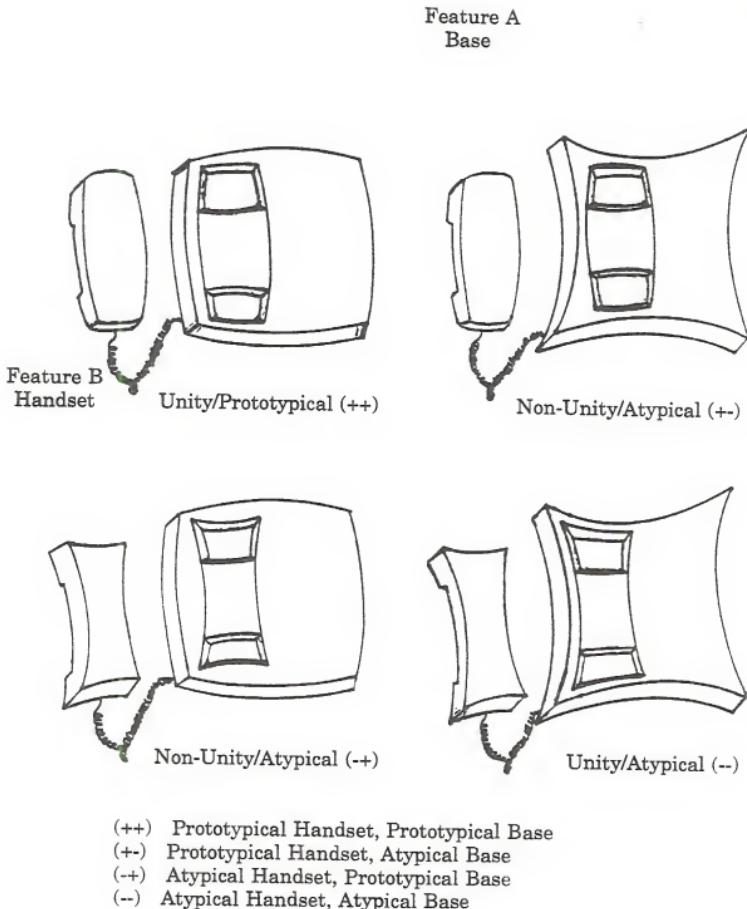


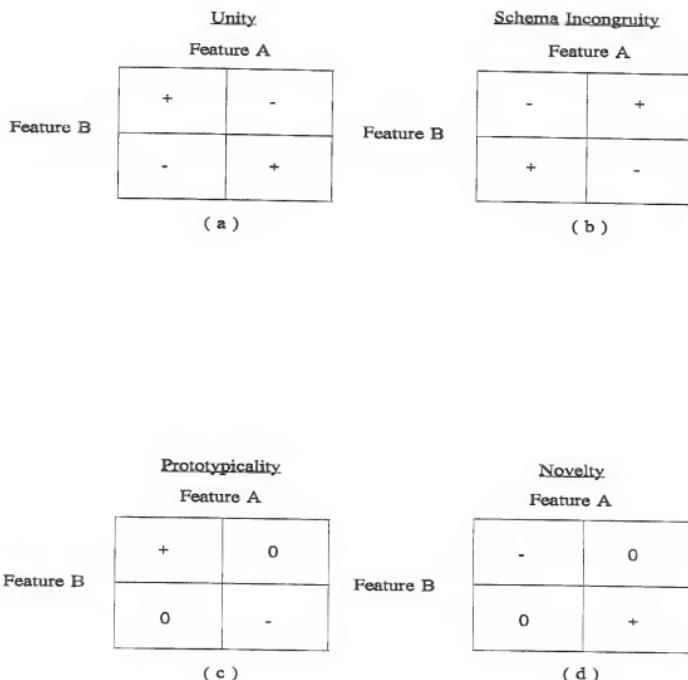
FIGURE III-1
EXAMPLE OF UNITY AND PROTOTYPICALITY MANIPULATIONS

all of the products that were used as stimuli was established through an examination of the products available on the market and was confirmed in pilot tests.¹ This product form is also unified in that there is consistency or compatibility among the shapes of the base (Feature A) and the handset (Feature B). In this (prototypical) case the number of shared features with the category schema is high (positive) and unity or a visual connection or consistency among product features is also high (positive). In the upper right-hand cell of Figure III-1, the base (Feature A) of the product has been altered using a shape transformation so that it is no longer the same as that of the category prototype. This change has at the same time decreased the unity between the handset feature and the base feature. Thus, this version of the telephone product is atypical (+-) with respect to one of the two features being manipulated and is no longer unified. The same is true of the product in the lower-left cell of Figure III-1. In this case, the shape of the handset was altered in order to effect the manipulations of prototypicality and unity that would produce an atypical (+-) stimulus on one product feature and an "un-unified" appearance. The base and handset features of the product in the lower-right corner of Figure III-1 have both been altered. In this case the product no longer shares the shape of either Feature A or Feature B with the

¹ The aggregate mean ratings for the familiarity of the eleven stimulus sets that were pilot tested were as follows: Unity/Prototypical ($M = 6.46$), Non-unity/Atypical ($M = 4.86$), Non-unity/Atypical ($M = 4.96$), and Unity/Atypical (4.76). Product variations were rated on 9-point semantic differential scales with 9 being the most familiar.

category prototype. Thus, this product is quite atypical (--) with respect to prototypicality. This version does, however, exhibit unity since there is a visual connection or consistency among the two product features. As can be seen in the figure, this manipulation of the two product features results in three levels of prototypicality and two levels of unity being produced.

Four possible patterns of results are shown in Figure III-2. These patterns have been labeled to indicate the explanation of aesthetic response that each supports. The unity explanation of aesthetic response would be supported by results showing that both unity conditions were more highly rated than both of the non-unity conditions (Figure III-2a). Such results would suggest that a product variation's consistency with the unity visual organization principle positively influenced subjects' aesthetic responses. The predictions of the schema incongruity hypotheses are the opposite of those for the unity explanation of aesthetic response. The schema incongruity hypotheses predict that moderately atypical stimuli will be preferred to stimuli that are prototypical or extremely atypical (Figure III-2b). The prototypicality explanation of aesthetic response would be supported by the results depicted in Figure III-2c. Here, the more prototypical a product variation is the higher its ratings. A pattern of results exactly opposite those for the prototypicality explanation would suggest an effect of novelty (Figure III-2d). In this way, the basic 2(Feature A) x 2(Feature B) design allows the hypotheses presented earlier to be examined.



- + indicates the highest (i. e., most positive) rating(s) for a product version contained in the stimulus set.
- indicates the lowest rating(s) for a product version contained in the set.
- 0 indicates a rating between the highest and lowest ratings.

FIGURE III-2
POSSIBLE PATTERNS OF RESULTS

Stimulus Development

The construction of stimuli that are to be used in research that examines aesthetic influences requires a great deal of care. Many aspects of an object's appearance have the potential to affect aesthetic responses. The influence of aesthetic aspects of a stimulus object (e. g., a product or a picture of a product) such as color, perspective, shading, etc. that could affect an aesthetic response must be eliminated or controlled. In addition to the problems and limitations inherent in controlling for extraneous aesthetic influences, the construction of visual (i. e., pictorial) stimuli for aesthetic research is further complicated by the fact that it is usually difficult to precisely determine the strength of variables of interest (Nunnally 1981).

Although there are quite a number of studies that have manipulated prototypicality (e. g., Hutchinson and Alba 1991), there is little in the way of precedent for constructing stimuli that simultaneously exhibit different levels of prototypicality and unity. The construction of sets of stimuli for this experiment necessitated an exploration of the ways that unity and prototypicality could be manipulated across a range of products. There were four principal requirements that guided the development of the stimulus sets. The first requirement, which pertained to the selection of particular products, was that the product class had to have a strong category prototype. In order to investigate the hypotheses concerning prototypicality it was necessary for there to be a strong prototypical product design (i. e., form, configuration) for

the product category. A second requirement that directed the selection of products for the stimuli sets concerned the (non)existence of a product that was atypical but unified. Product categories that contained instances of products that were atypical (i. e., novel) and unified were considered problematic because in such cases people may be more favorably disposed (i. e., receptive) toward atypical (but unified) product designs due to prior experience with or knowledge of the product. If this were the case it could lead to results that overstated the influence of the unity design factor. This is especially important since Experiment 1 effectively provides a theory test between a prototypicality explanation of aesthetic response and a unity explanation. A third requirement involved product conduciveness to the manipulation of unity. In order for a product to exhibit unity (i. e., a visual connection among elements, repetition of form or pattern) or disunity the product had to have parts that could be perceived and manipulated separately. The fourth requirement that guided the development of the stimulus sets concerned the medium used to create the stimuli and stimulus communicability. A medium was needed that would allow the creation and presentation of stimulus products that were drastically different from the products that currently existed. This made it difficult to construct stimuli by altering (either photographically or using computer scanned images) existing products or pictures of existing products because such modification often results in introducing "aesthetic confounds"

(e. g., inconsistent perspective) and unintended degradation (e. g., blurry edges, cloudy surfaces) into a stimulus.²

The need for a method that afforded the construction of previously "uncreated" (i. e., nonexistent) products that were markedly different from existing products and the need to control for extraneous aesthetic influences led to the use of line drawings. The use of drawings does entail a trade-off of realism for "producibility" and greater experimental control. While this reduction in realism is unfortunate, it is not uncommon for research that is conducted in a laboratory setting. The use of drawings was also more practical for the purpose of reproducing the stimuli for inclusion in the booklets used in the experiment. This method of constructing stimuli necessitated the selection of products that could be clearly communicated through simple line drawings.

A number of products in a wide variety of product categories were examined in catalogs and in stores in order to determine their suitability for use as stimuli in this experiment. An initial series of product "studies" (i. e., sketches) was done to explore ways of manipulating products along the unity and prototypicality dimensions. A number of products that seemed to meet the four requirements were then selected for further development in product

² The possibility of modifying computer scanned images was explored. This approach proved to be unsatisfactory for the purposes of creating the stimuli for this particular experiment because the radical changes that had to be made to the computer scanned images introduced aesthetic confounds into the stimuli and often resulted in severe degradation of the image.

studies. A list of these products is presented in Appendix A. These product studies led to the identification of three basic ways to transform the features of the products so as to simultaneously accomplish the prototypicality and unity manipulations. These transformations involved altering product features by changing the shape of parts of the product, adding texture to parts of the product, or adding trim to part of the product. Additional product studies were then undertaken to determine which products could be manipulated using each of the three transformations (shape, trim, and texture). These studies involved producing four versions of each product (for each of the three types of transformations) by systematically transforming two product features in order to accomplish the unity manipulation (i. e., a visual connection among product features) at a particular level of prototypicality (i. e., shared features with the category prototype).

In order to increase the generalizability of the results and demonstrate the robustness of the effects of interest, nine product categories were selected for use as stimuli. These nine product categories were: alarm clocks, bathroom scales, dressers, flashlights, hair dryers, lamps, refrigerators, telephones, and television remote controls. This resulted in a total of twenty-seven replications (nine product categories x three types of transformation). Each of these products had to be produced in four versions (Unity/Prototypical ++, Non-unity/Atypical +-, Non-unity/Atypical -+, and Unity/Atypical --). Thus, the

entire stimuli set contained one hundred and eight drawings of products. Examples of these stimuli sets are presented in Appendix B.

Experimental Design

The overall design of the experiment is a 2(Feature A) x 2(Feature B) x 9(Products) x 3(Version) x 2(Order) mixed factorial design. As was pointed out in the preceding discussion the manipulation of features A and B result in the manipulation of prototypicality and unity. The twenty-seven replicate sets of stimuli were organized into three questionnaire versions. Each of the three questionnaire versions contained all nine of the product categories (each product category was made up of a set of four variations of the product -- i. e., Feature A x Feature B) but for only one of the three transformation types (shape, trim, or texture). So for example, questionnaire version one contained the telephone stimulus set (set of four product variations) that were altered using the trim transformation; questionnaire version two contained the telephone stimulus set altered using the texture transformation; and questionnaire version three contained the telephone stimulus set altered using the shape transformation. While each questionnaire contained each of the nine product categories, in three of the nine cases the trim transformation was utilized, in three of the nine cases the texture transformation was utilized, and in three of the nine cases the shape transformation was utilized. A diagram of this design is presented in Appendix C. Thus, Feature A, Feature B,

Products, and Transformation were all within-subjects factors. Particular transformations of the nine product categories (i. e., stimulus sets) were contained in the questionnaire Versions. Questionnaire Version and Order were between-subjects factors. The order in which the stimulus products (stimulus sets) were presented was reversed for half of the subjects.

Experimental Procedure

One-hundred and ninety-seven volunteer subjects enrolled in the Introductory Marketing course at the University of Florida participated in this experiment.³ Subjects received extra credit for their participation. The subjects were run in groups of 10-20 participants. The stimulus materials were contained in a booklet. The introductory page informed the subjects that they would be shown drawings of products and asked to evaluate the appeal of the product ideas based on their appearance. The subjects were told that the purpose of the study was to obtain consumers' reactions to products that companies were considering for introduction. It was also explained to the subjects that the products they were going to be evaluating were in the early stage of the product development process and for this reason the drawings were in a very rough (unfinished) form. Subjects were then told that each of the versions of a product performed equally well and that they were to rate all

³ Power estimates using pilot data and the procedure suggested by Cohen (1977, pp. 364-379) for factorial designs indicated that this sample size would be sufficient for estimating effect sizes at the $p < .05$ level.

four of the product versions that were shown on each page. Subjects were then allowed to proceed through the task of rating the products at their own pace. The subjects rated each product design on 9-point semantic differential scales that measured aesthetic response (beautiful/ugly), familiarity (familiar/unfamiliar), attitude (like/dislike), quality (high quality/low quality), and price (high price/low price).⁴ Following the rating tasks, subjects were asked to write about how they determined the ratings that they gave to the proposed products. The entire procedure took approximately one-half hour to complete.

Results and Discussion

The manipulation check of the effect of a change in either Feature A or Feature B on aesthetic responses found that there was, in fact, a reduction in ratings of the appearance of the products (compared to those of the prototypical product version) as measured on the semantic differential scale anchored by Beautiful/Ugly. This is to say that in the case of the product variations that were altered so that one feature (either Feature A or Feature B) was no longer prototypical or unified the effect of the change was a reduction in positive aesthetic response. The average effect of a change in Feature A on aesthetic responses was -1.24. Likewise, the average effect of a change in Feature B on

⁴ The direction of some of these scales was reversed in order to reduce possible response bias on the part of subjects.

aesthetic response was a -1.34. This pattern was consistent across most of the sets of stimuli for each product transformation (i. e., stimulus sets).⁵ The effects of a change in Feature A or Feature B from the category prototype are shown in Table III-1. In twenty-one of the twenty-seven stimulus sets the change of either Feature A or Feature B resulted in a lower beauty rating for the product variation as compared with the rating for the category prototype. In two stimulus sets the effects of a change in the product features were mixed. That is, a change in one feature (either A or B) had a negative effect on aesthetic response but a change in the other feature (B or A) had a positive effect (see the lamp/trim and lamp/texture stimulus sets in Table III-1). In only four of the twenty-seven stimulus sets were the effects of a change in Feature A and Feature B both (separately) in the opposite (i. e., positive) direction (see the bathroom scale/trim, bathroom scale/texture, TV remote control/trim, and the hair dryer/trim stimulus sets in Table III-1). Overall, the manipulation check demonstrates that for the majority of the stimulus sets a reduction in favorable aesthetic response does occur when the products are altered in such a way as to be both less prototypical and less unified than the category prototype. It should be noted that there is variation in the reduction in favorable aesthetic response across the twenty-seven stimulus sets. This is to be expected given the difficulties of precisely estimating the strength of each

⁵ "Stimulus set" will be used throughout this discussion to refer to one of the transformation types (shape, trim, or texture) of a product category (e. g., telephone/shape transformation set).

TABLE III - 1
 MANIPULATION CHECK FOR THE EFFECT OF A CHANGE
 IN FEATURE A OR B ON BEAUTY RATINGS

Product		Feature A	Feature B
1. Bathroom scale			
Sh		-0.14	-0.17
Tr		1.00	0.14
Tx		1.77	0.86
2. TV Control			
Sh		-0.73	-0.22
Tr		0.65	0.97
Tx		-0.98	-0.84
3. Flashlight			
Sh		-1.83	-1.16
Tr		-3.04	-3.55
Tx		-2.36	-3.31
4. Lamp			
Sh		-0.16	-0.14
Tr		0.02	-1.28
Tx		-0.07	1.06
5. Refrigerator			
Sh		-4.00	-3.60
Tr		-1.09	-1.12
Tx		-3.80	-3.64
6. Telephone			
Sh		-2.60	-1.01
Tr		-0.28	-1.25
Tx		-0.56	-0.99

TABLE III - 1 -- continued
 MANIPULATION CHECK FOR THE EFFECT OF A CHANGE
 IN FEATURE A OR B ON BEAUTY RATINGS

Product	Feature A	Feature B
7. Hair dryer		
Sh	-1.59	-3.72
Tr	0.33	0.33
Tx	-3.58	-3.77
8. Dresser		
Sh	-0.13	-0.54
Tr	-1.88	-1.75
Tx	-2.07	-1.20
9. Clock		
Sh	-3.33	-3.00
Tr	-1.43	-1.44
Tx	-1.60	-1.72
Mean effect of change across products	-1.24	-1.34

manipulation (i. e., change in Features A and B via the transformation type) as it is adapted for each of the stimulus sets.

The Influence of Unity and Prototypicality on Aesthetic and Derived Responses

The critical test concerns what happens to aesthetic responses in the case where both Feature A and Feature B are altered so that they are less prototypical but more unified. The prediction consistent with the "prototypicality" hypothesis is that in such a case the aesthetic response ratings should go down since the resulting stimulus is quite atypical. The

"unity" hypothesis, however, suggests that if the changes in the features are made in a way that increases unity then aesthetic responses should be higher in this case (as opposed to the non-unity cases) since the product version exhibits consistency with the visual organization principle of unity. This is in effect a theory test (for a linear model) which corresponds to a test of the Feature A x Feature B interaction. This test can be extended to the investigation of the influence of unity and prototypicality on derived responses.

Analyses

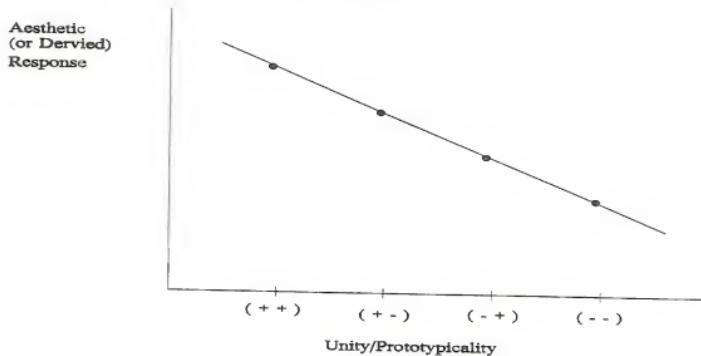
The data were analyzed using mixed ANOVA designs with Version and Order being treated as between-subjects factors and Feature A, Feature B, and Products being treated as within-subjects factors. Transformation was also treated as a within-subjects factor because each subject saw products that had been altered using the three different transformation types.

Subjects' product ratings on the five 9-point semantic differential scales were treated in three different ways in order to compute the dependent measures that were analyzed. The first approach was to perform the analysis directly on subjects' ratings of the products. A second approach involved computing the linear contrast that reflected the interaction of Feature A and Feature B (i. e., the main effect of unity) for each design set. Under this approach difference or "interaction" scores were formed by adding subjects' ratings for the Unity/Prototypical and Unity/Atypical conditions and

subtracting from this the ratings for both of the Non-unity/Atypical conditions. The resulting score provides a straight-forward measure of the main effect of unity. The third way of forming the dependent measures involved a modification of the interaction score. This variation entailed subtracting the product rating of the lowest rated Non-unity/Atypical condition from the product rating for the Unity/Atypical condition. This score allows a non-linear model of prototypicality to be examined (see Figure III-3). If prototypicality dominates unity then product versions that are more similar to the category prototype should receive higher ratings than less typical product versions (i. e., the minimum rating for either of the Non-unity/Atypical conditions should always be greater than the rating for the Unity/Atypical condition since the former always has more shared features with the category prototype than does the latter).

Both the unity linear score (U_L) and the unity nonlinear score (U_N) are needed in order to get a (more) complete sense of the effects of unity and prototypicality. While the U_L score does provide an indication of the main effect of unity, it does not examine a (decreasing) non-linear model of prototypicality. The U_N score does examine a non-linear model of prototypicality; however, the U_N score reflects some random variation in the subjects' ratings (i. e., the lowest rated Non-unity/Atypical condition is always used to construct the U_N score). Parallel analyses were conducted on each of the three variations of dependent measures (i. e., ratings scores, linear unity

Linear Model



Nonlinear Model

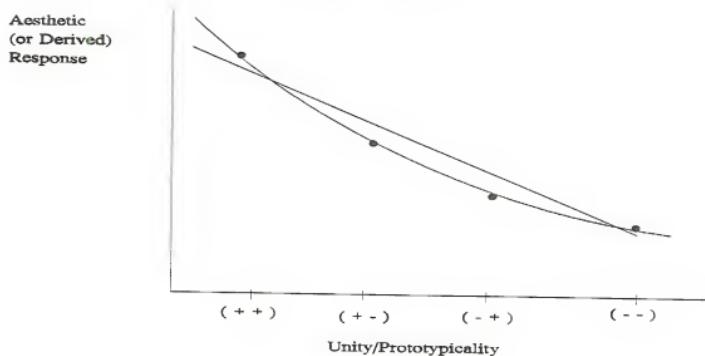


FIGURE III-3
LINEAR AND NONLINEAR "UNITY" SCORES

scores, and nonlinear unity scores) in order to insure that the results reported were not simply an artifact of a particular analysis scheme.

Hypothesis Testing

The critical test for examining the hypotheses concerning the influence of unity and prototypicality on aesthetic and derived responses involves the Feature A x Feature B interaction. In this design, the Feature A x Feature B interaction is the main effect of unity. This interaction "tests" the competing predictions of the prototypicality and unity hypotheses. If the Unity/Prototypical (++) products of this design receive higher ratings than the Non-Unity/Atypical (+-) and Non-unity/Atypical (-+) products and these in turn are more highly rated than the Unity/Atypical (--) products then the prototypicality explanation of aesthetic (and derived) response would seem to be supported (Hypothesis 2). If, however, the Unity/Prototypical (++) products and the Unity/Atypical (--) products were both rated significantly higher than the Non-unity/Atypical (+-, +-) products then support for the unity hypothesis would be indicated (Hypothesis 1). The schema incongruity explanation of aesthetic response would be supported if the Non-unity/Atypical (+-, +-) products were rated significantly higher than the prototypical products (++) and/or the extremely atypical products (--). If aesthetic response was found to be positively related to atypicality than this would suggest a novelty effect.

The means for the product beauty ratings for each of the twenty-seven stimulus sets are presented in Table III-2. Across the twenty-seven stimulus sets the products that did not exhibit unity ($M = 4.06$) were rated lower than the products that did exhibit unity ($M = 5.12$). The analysis of variance presented in Table III-3 indicates that this difference which is captured in the Feature A x Feature B interaction is significant $F(1,184) = 338.16, p < .0001$. This supports the unity hypothesis which predicted that aesthetic responses are more positive for objects (products) that exhibit high consistency with the visual organization principle of unity than they are for objects (products) that are not consistent with the unity visual organization principle.

The significance of the Factor A x Factor B interaction (i. e., main effect of unity) was also tested in parallel analyses that utilized the linear unity scores (U_L) formed from subjects' ratings of all four versions of each stimulus set [i. e., (Unity/Prototypical + Unity/Atypical) - (Non-unity/Atypical + Non-Unity/Atypical)] and the nonlinear unity scores (U_N) [i. e., (Unity/Atypical) - minimum (Non-unity/Atypical)]. The analysis of variance tables for each of these approaches are shown in Table III-4 and Table III-5. The unity hypothesis (i. e., Feature A x Feature B interaction) is tested by determining whether or not the intercept is zero. That is, if the intercept were actually zero, what would the probability be of obtaining, by chance alone, a value as large or larger than the one actually obtained? The results reported in Table

TABLE III - 2
MEAN BEAUTY RATINGS AND UNITY SCORES

Product	(++)	(+−)	(−+)	(−−)	U _L	U _N
1. Bathroom Scale						
Sh	5.30	5.16	5.13	5.18	0.85	0.88***
Tr	4.42	5.42	4.56	5.81	0.12*b	1.38***
Tx	4.03	5.80	4.89	4.81	-0.89	0.43+
2. TV Control						
Sh	4.82	4.09*a	4.60	4.95	0.51**	1.41***
Tr	3.98	4.63	4.95	6.42	0.44*	2.23***
Tx	5.36	4.38**	4.52**	5.28	0.84**	1.36***
3. Flashlight						
Sh	6.31	3.95***	3.00***	3.05***	1.20***	0.55**
Tr	5.57	3.74***	4.41***	3.97***	0.70***	0.61*
Tx	5.89	2.85***	2.34***	5.15*	2.94***	3.00***
4. Lamp						
Sh	5.64	5.66	4.36***	4.36**	0.00	0.39*
Tr	4.65	4.58	5.71	5.92	0.14	1.42***
Tx	5.00	4.84	4.86	6.05	0.68**	2.08***
5. Refrigerator						
Sh	6.00	2.00***	2.40***	3.95***	2.80***	2.20***
Tr	5.31	4.22**	4.19**	5.70	1.28***	2.03***
Tx	6.03	2.23***	2.39***	3.34***	2.34***	1.32***
6. Telephone						
Sh	5.30	2.70***	4.29**	3.48***	0.90***	0.94**
Tr	5.44	5.16+	4.19***	4.18***	0.15	0.21+
Tx	5.74	5.18**	4.75***	6.02	0.90***	1.41***

TABLE III - 2 -- continued
MEAN BEAUTY RATINGS

Product	(++)	(+-)	(-+)	(--)	U_L	U_N
7. Hair dryer						
Sh	6.57	4.98***	2.85***	3.30***	0.90***	0.61**
Tr	4.64	4.98	4.98	5.42	0.03	0.92***
Tx	6.33	2.75***	2.56***	5.17**	3.06***	2.94***
8. Dresser						
Sh	5.08	4.95	4.54*	5.66	0.62***	1.80***
Tr	5.44	3.56***	3.69***	6.61	2.41***	3.26***
Tx	5.64	3.57***	4.44**	4.54**	0.99***	1.42**
9. Clock						
Sh	5.72	2.39***	2.72***	4.75**	2.65***	2.58***
Tr	4.92	3.49***	3.48***	4.26**	1.07***	1.09***
Tx	5.17	3.57***	3.45***	5.00	1.56***	1.71***
Total ^c	5.34	4.10***	4.01***	4.90***	1.05***	1.48***

a Indicates that the difference for a change in a feature from prototypical to atypical was significant based on the t-statistic computed for each product/transformation pair.

b Indicates unity score is significantly different from zero.

c Statistical significance based on ANOVA results reported in the text.

*** Indicates differences significant at $p < .001$ in one-tailed-tests.

** Indicates differences significant at $p < .01$ in one-tailed-tests.

* Indicates differences significant at $p < .05$ in one-tailed-tests.

+ Indicates differences significant at $p < .1$ in one-tailed-tests.

TABLE III - 3
ANALYSIS OF VARIANCE FOR BEAUTY DEPENDENT MEASURE
RATING SCORE APPROACH

Source	DF	Type III SS	F-Value	P > F
<u>Between Subject Effects</u>				
Version	2	42.9350	1.63	0.1991
Order	1	13.7790	1.05	0.3080
Version * Order	2	107.6630	4.08	0.0184
Error Sub (Version Order)	184	2425.7720		
<u>Within Subject Effects</u>				
Product	8	1081.1417	40.78	0.0001
Trans	2	165.0833	24.91	0.0001
Prod * Version (Residual)	14	566.1260	12.02	0.0001
Prod * Order	8	199.3217	7.52	0.0001
Trans * Order	2	5.4222	0.82	0.2500
Prod * Version * Order (Residual)	14	43.1955	0.93	0.2500
Error Sub (Product)	1472	4878.0299		
Feature A	1	124.2720	23.97	0.0001
A * Version	2	252.2238	24.33	0.0001
A * Order	1	10.6083	2.05	0.1542
A * Version * Order	2	6.1115	0.59	0.5556
Error Sub (A)	184	953.7624		
Feature B	1	52.8499	11.86	0.0007
B * Version	2	114.6225	12.86	0.0001
B * Order	1	21.7458	4.88	0.0284
B * Version * Order	2	17.8531	2.00	0.1378
Error Sub (B)	184	819.8276		
Feature A * Feature B	1	1941.8813	338.16	0.0001
A * B * Version	2	67.4647	5.87	0.0034
A * B * Order	1	3.1291	0.54	0.4614
A * B * Version * Order	2	5.6170	0.49	0.6140
Error (A * B)	184	1056.6273		
Prod * A * B	8	933.9437	53.26	0.0001
Prod * A * B * Version	16	787.4382	22.45	0.0001
Prod * A * B * Order	8	94.0783	5.37	0.0001
Prod * A * B * Version * Order	16	35.9705	1.03	0.4255
Error Sub (Prod * A * B)	1472	3226.3444		

TABLE III - 4
 ANALYSIS OF VARIANCE FOR BEAUTY DEPENDENT MEASURE
 LINEAR SCORE APPROACH

Source	DF	Type III SS	F-Value	P > F
<u>Between Subject Effects</u>				
Intercept	1	7767.5254	338.16	0.0001
Version	2	269.8589	5.87	0.0034
Order	1	12.5163	0.54	0.4614
Version * Order	2	22.4679	0.49	0.6140
Error Sub (Version * Order)	184	4226.5090		
<u>Within Subject Effects</u>				
Product	8	3735.7748	53.26	0.0001
Trans	2	549.8955	31.36	0.0001
Prod * Version (Residual)	14	2599.8573	21.18	0.0001
Prod * Order	8	376.3133	5.37	0.0001
Trans * Order	2	40.2259	2.29	0.2500
Prod * Version * Order (Residual)	14	103.6562	0.84	0.2500
Error Sub (Prod)	1472	12905.3777		

III-4 and Table III-5 clearly indicate support for the unity hypothesis. The intercept using the linear unity score (U_L) as the dependent measure was significantly different from zero $F(1,184) = 338.16$, $p < 0.0001$.⁶ The intercept as tested using the nonlinear unity score (U_N) approach was also significantly different from zero $F(1,190) = 473.48$, $p < 0.001$.⁷ The fact that there is a small, but significant t ($190 = 6.04$, one-tailed $p < .001$) difference between the means of the Unity/Prototypical (++) products ($M = 5.34$) and the

⁶ The results for the linear unity scores are identical to the results for the ratings score approach.

⁷ The difference in the denominator degrees of freedom are due to missing data that caused several subjects to be eliminated from the "unity score" analysis.

TABLE III - 5
 ANALYSIS OF VARIANCE FOR BEAUTY DEPENDENT MEASURE
 NONLINEAR UNITY SCORE APPROACH

Source	DF	Type III SS	F-Value	P > F
<u>Between Subject Effects</u>				
Intercept	1	3873.5708	473.48	0.0001
Version	2	340.8709	20.83	0.0001
Order	1	3.2588	0.40	0.5287
Version * Order	2	1.3466	0.08	0.9210
Error Sub (Version * Order)	190	1554.4164		
<u>Within Subject Effects</u>				
Product	8	298.1844	9.67	0.0001
Trans	2	63.3658	8.21	0.0001
Prod * Version	14	484.9146	8.98	0.0001
Prod * Order	8	123.7531	4.01	0.0100
Trans * Order	2	41.8300	5.42	0.0100
Prod * Version (Residual)	14	75.8172	1.40	0.2500
Error Sub (Prod)	1520	5861.4233		

Unity/Atypical (--) products (M = 4.90) suggests that prototypicality does have some effect on aesthetic responses.

The analysis of variance presented in Table III-3 as well as those shown in Table III-4 and Table III-5 also show that there were a number of factors and interactions among factors that resulted in significant effects in this design. Most of these significant effects can be attributed to differences in the strength of the manipulations used to create each stimulus set and the differences across product categories. The effect of Product was significant, $F(8,1472) = 40.78$, $p < .0001$, as was the effect of Transformation type $F(2,1472) = 24.91$, $p < .0001$. Since stimulus sets (i. e., Transformation types) are contained in each of the versions of the questionnaire the effects of these

factors are also indicated in the Product x Version (Residual) interactions.⁸ The differential strength of the manipulations across stimulus sets was further examined in order to ensure that the effects were in the right direction across the twenty-seven stimulus sets. This was done by conducting t-tests using the "unity" scores for each of the stimulus sets in order to assess the degree to which the effect of unity was significant and in the proper direction across the twenty-seven stimulus sets despite the differences in the strength of the manipulations. The analysis for the linear unity scores is shown in Table III-6 (the unity scores were also presented in Table III-2). In twenty-one out of the twenty-seven stimulus sets the linear unity scores are significantly different from zero ($p < .05$; $p < .01$ for nineteen of the stimulus sets). In six cases the interaction scores were not significant and in only one case was a score negative and significant (i. e., in the "wrong" direction).⁹ The findings are similar when the analysis is conducted using nonlinear unity scores. This analysis is presented in Table III-7. When the differential strength of the

⁸ In this design the main effect of Transformation type is examined using a Latin square type orthogonal fraction of the complete five factor design. This is consistent with the treatment suggested by Winer, Brown, and Michels (1991, pp. 706-711) for Latin squares and related designs.

⁹ This negative case occurred for the texture manipulation of the bathroom scale stimulus set. All three of the bathroom scale product/cases were found to be somewhat problematic because this product was not easily divided into two separate parts (e. g., telephone stimulus - handset, base). This was particularly true for the texture manipulation of the bathroom scale (see bathroom scale/texture stimuli in Appendix B).

TABLE III - 6
ANALYSIS OF MANIPULATION STRENGTH DIFFERENCES -
LINEAR UNITY SCORES

Product	U _L Score for Beauty	S. E.	t-test
1. Bathroom scale			
Sh	0.8335	0.2032	0.8201
Tr	0.1212	0.1449	1.6726*
Tx	-0.8923	0.4442	-4.0172
2. TV Remote Control			
Sh	0.5076	0.3853	2.6345**
Tr	0.4384	0.3913	2.2410*
Tx	0.8409	0.4711	3.5696**
3. Flashlight			
Sh	1.2032	0.3527	6.8233***
Tr	0.6969	0.3547	3.9298***
Tx	2.9394	0.4888	12.0267***
4. Lamp			
Sh	0.0000	0.2412	0.0000
Tr	0.1385	0.2787	0.9938
Tx	0.6770	0.4214	3.2124**
5. Refrigerator			
Sh	2.7955	0.4302	12.9961***
Tr	1.2770	0.4308	5.9281***
Tx	2.3359	0.4761	9.8119***
6. Telephone			
Sh	0.9000	0.4309	4.1773***
Tr	0.1485	0.2062	1.4401
Tx	0.9015	0.4160	4.3341***

TABLE III - 6 .. continued
 ANALYSIS OF MANIPULATION STRENGTH DIFFERENCES -
 LINEAR UNITY SCORES

Product	U_L Score for Beauty	S. E.	t-test
7. Hair dryer			
Sh	0.8940	0.4167	4.2902***
Tr	0.0303	0.3029	0.2000
Tx	3.0539	0.5295	11.5353***
8. Dresser			
Sh	0.6137	0.3105	3.9526***
Tr	2.4077	0.4661	10.3311***
Tx	0.9925	0.5844	3.3966***
9. Clock			
Sh	2.6462	0.4438	11.9243***
Tr	1.0682	0.4164	5.1308***
Tx	1.5531	0.3905	7.9536***

- *** Indicates differences significant at $p < .001$ in one-tailed-tests.
- ** Indicates differences significant at $p < .01$ in one-tailed-tests.
- * Indicates differences significant at $p < .05$ in one-tailed-tests.
- + Indicates differences significant at $p < .1$ in one-tailed-tests.

manipulations is examined by looking at the difference between the Unity/Atypical product and the lowest rated Non-Unity/Atypical product for each stimulus set, all of the scores are positive and the scores for twenty-five of the stimulus sets are significant at the $p < .05$ level (twenty-two of these are significant at the $p < .01$ level or higher). These analyses suggest that even though there are differences in the strengths of the manipulations due to transformation type and product class, the effect of unity is relatively consistent (i. e., significantly positive) across both products and transformations.

TABLE III - 7
ANALYSIS OF MANIPULATION STRENGTH DIFFERENCES -
NONLINEAR UNITY SCORES

Product	U_N Score for Beauty	S. E.	t-test
1. Bathroom scale			
Sh	0.8788	0.1985	4.4272***
Tr	1.3788	0.1988	6.9359***
Tx	0.4308	0.2816	1.5296+
2. TV Remote Control			
Sh	1.4091	0.2653	5.3113***
Tr	2.2308	0.2287	9.7551***
Tx	1.3636	0.2981	4.5741***
3. Flashlight			
Sh	0.5539	0.2352	2.3551**
Tr	0.6061	0.2678	2.2628*
Tx	3.0000	0.3260	9.2017***
4. Lamp			
Sh	0.3939	0.1753	2.2479*
Tr	1.4242	0.2275	6.2592***
Tx	2.0769	0.2768	7.5047***
5. Refrigerator			
Sh	2.1969	0.2800	7.8451***
Tr	2.0308	0.2685	7.5629***
Tx	1.3182	0.2663	4.9493***
6. Telephone			
Sh	0.9394	0.2678	3.5073**
Tr	0.2121	0.1441	1.4725+
Tx	1.4091	0.2443	5.7688***

TABLE III - 7 -- Continued
ANALYSIS OF MANIPULATION STRENGTH DIFFERENCES -
NONLINEAR UNITY SCORES

Product	U_N Score for Beauty	S. E.	t-test
7. Hair dryer			
Sh	0.6061	0.2470	2.4536**
Tr	0.9242	0.2226	4.1516***
Tx	2.9385	0.3375	8.7074***
8. Dresser			
Sh	1.8030	0.2416	7.4624***
Tr	3.2615	0.2375	13.7356***
Tx	1.4242	0.4108	3.4666**
9. Clock			
Sh	2.5846	0.2556	10.1118***
Tr	1.0303	0.2471	4.1696***
Tx	1.7121	0.2068	8.2777***

*** Indicates differences significant at $p < .001$ in one-tailed-tests.
 ** Indicates differences significant at $p < .01$ in one-tailed-tests.
 * Indicates differences significant at $p < .05$ in one-tailed-tests.
 + Indicates differences significant at $p < .1$ in one-tailed-tests.

While an interaction of order with the effect of unity (i. e., the Feature A \times Feature B interaction) was not indicated, order was found to interact with factors such as Product. In part, the effect of order seems to be attributable to subjects increasing acceptance of the use of the simplified (i. e., line drawings without color) drawings to depict products. Such an explanation is suggested by the fact that, in general, when the stimuli for a particular product category were rated toward the end of the rating task they received slightly higher ratings than when they were rated at the beginning of the

rating task. This was controlled for to some degree by reversing the presentation order of stimuli in the second order.

Perceived Familiarity

Hypothesis 6 predicted that consistency with the visual organization principle of unity was positively related to perceived familiarity. The means for the familiarity ratings for each of the twenty-seven stimulus sets are presented in Table III-8. The analysis of variance tables for the rating score, linear unity score, and nonlinear unity score approaches are presented in Tables III-9, III-10, and III-11, respectively.

The analysis of variance for the subject ratings of familiarity (Table III-9) indicates a significant unity effect for perceived familiarity $F(1,181) = 254.47$, $p < .0001$. The results for the analysis of variance using linear unity scores were very similar to those observed using subject ratings with the unity effect achieving the same level of significance $F(1,181) = 254.47$, $p < .0001$. The analysis of variance for the nonlinear score approach, which is probably the most appropriate analysis in this case since it removes the influence of the Unity/Prototypical cell of the design, also indicates a significant effect of unity on perceived familiarity $F(1,188) = 10.65$, $p < .0013$.¹⁰ These results suggest that unity can encourage feelings of perceived familiarity.

¹⁰ The pattern of interactions observed among Product, Transformation type, and Order were the same as were discussed for the influence of unity on aesthetic responses.

TABLE III - 8
MEAN FAMILIARITY RATINGS AND UNITY SCORES

Product	(++)	(+-)	(-+)	(--)	U_L	U_N
1. Bathroom scale						
Sh	7.62	7.14*** ^a	5.40***	5.56***	0.31** ^b	0.45*
Tr	7.06	6.97	7.13	6.98	0.025	0.27
Tx	7.05	6.77	6.23*	6.10**	0.03	0.42
2. TV Remote Control						
Sh	7.59	5.08**	5.41***	4.94***	0.97***	0.65
Tr	6.62	6.13*	6.51	6.89	0.53**	1.45***
Tx	7.35	5.17***	5.32***	5.86***	1.31***	1.00***
3. Flashlight						
Sh	7.93	4.80***	4.16***	4.05***	1.54***	0.27
Tr	7.49	5.52***	5.79***	5.49***	0.84***	0.35
Tx	7.49	4.52***	4.27***	6.35***	2.43***	2.21***
4. Lamp						
Sh	8.22	5.95***	3.98***	3.57***	0.89***	-0.18
Tr	7.21	6.10***	6.81*	6.60*	0.45**	0.67**
Tx	7.43	6.38**	6.18**	7.46	1.19***	2.02***
5. Refrigerator						
Sh	7.97	3.16***	3.25***	3.84***	2.68***	0.92***
Tr	7.75	5.52***	5.28***	6.61***	1.88***	1.74***
Tx	8.22	4.21**	4.29***	4.52***	2.16***	0.67**
6. Telephone						
Sh	7.26	3.84***	4.77***	3.41***	1.10***	-0.31
Tr	7.16	6.19***	5.46***	5.52***	0.50***	0.34**
Tx	6.89	6.24**	5.73***	6.41*	0.65***	0.82**

TABLE III - 8 -- continued
MEAN FAMILIARITY RATINGS AND UNITY SCORES

Product	(++)	(+-)	(-+)	(--)	U _L	U _N
7. Hair dryer						
Sh	8.05	6.48***	4.46***	4.40***	0.83***	0.21
Tr	7.05	6.38**	6.54*	6.44**	0.33*	0.52**
Tx	7.67	3.98***	4.30***	5.69***	2.68***	2.02***
8. Dresser						
Sh	7.76	6.62***	5.98***	6.29***	0.73**	0.56*
Tr	7.34	4.87***	4.97***	7.51	2.52***	2.95***
Tx	7.43	5.68***	5.63***	6.37*	1.18***	1.15***
9. Clock						
Sh	7.28	4.51***	4.75***	6.43**	2.19***	2.09***
Tr	7.33	5.68***	5.78***	6.08***	0.97***	0.77**
Tx	7.05	5.44***	5.76***	6.86	1.32***	1.50***
Total ^c	7.45	5.53***	5.34***	5.79***	1.19***	0.94***

- a Indicates that the difference for a change in a feature from prototypical to atypical was significant based on the t-statistic computed for each product/transformation pair.
- b Indicates unity score is significantly different from zero.
- c Statistical significance based on ANOVA results reported in the text.
- *** Indicates differences significant at $p < .001$ in one-tailed-tests.
- ** Indicates differences significant at $p < .01$ in one-tailed-tests.
- *
- + Indicates differences significant at $p < .05$ in one-tailed-tests.
- Indicates differences significant at $p < .1$ in one-tailed-tests.

TABLE III - 9
ANALYSIS OF VARIANCE FOR FAMILIARITY DEPENDENT MEASURE
RATING SCORE APPROACH

Source	DF	Type III SS	F-Value	P > F
Between Subject Effects				
Version	2	73.7530	0.55	0.5789
Order	1	233.9050	3.48	0.0638
Version * Order	2	8.6500	0.06	0.9377
Error Sub (Version * Order)	181	12174.5330		
Within Subject Effects				
Product	8	946.3903	20.96	0.0001
Trans	2	724.2835	64.16	0.0001
Prod * Version (Residual)	14	677.6986	8.58	0.0001
Prod. Order	8	38.3970	0.85	0.5582
Trans * Order	2	46.4860	4.12	0.0250
Prod * Version * Order (Residual)	14	189.0356	2.39	0.0100
Error Sub (Product)	1448	8172.4271		
Feature A	1	1459.8545	259.23	0.0001
A * Version	2	300.8827	27.71	0.0001
A * Order	1	7.6979	1.37	0.2439
A * Version * Order	2	17.3149	1.54	0.2177
Error Sub (A)	181	1019.2983		
Feature B	1	919.4761	185.88	0.0001
B * Version	2	14.4650	1.46	0.2345
B * Order	1	1.4952	0.30	0.5831
B * Version * Order	2	4.1657	0.42	0.6570
Error Sub (B)	181	895.3306		
A * B	1	2362.5960	254.47	0.0001
A * B * Version	2	69.0487	3.72	0.0261
A * B * Order	1	21.4075	2.31	0.1306
A * B * Version * Order	2	22.0981	1.19	0.3066
Error Sub (A * B)	181	1680.4642		
Prod * A * B	8	549.3698	28.33	0.0001
Prod * A * B * Version	16	434.3241	11.20	0.0001
Prod * A * B * Order	8	109.7385	5.66	0.0001
Prod * A * B * Version * Order	16	52.1372	1.34	0.1618
Error Sub (Prod * A * B)	1448	3510.0931		

TABLE III - 10
 ANALYSIS OF VARIANCE FOR FAMILIARITY DEPENDENT MEASURE
 LINEAR UNITY SCORE APPROACH

Source	DF	Type III SS	F-Value	P > F
<u>Between Subject Effects</u>				
Intercept	1	71.9460	10.65	0.0013
Version	2	426.8649	31.61	0.0001
Order	1	54.3667	8.05	0.0050
Version * Order	2	11.3613	0.84	0.4328
Error Sub (Version * Order)	188	1269.5378		
<u>Within Subject Effects</u>				
Product	8	727.7061	20.07	0.0001
Trans	2	661.0854	72.93	0.0001
Prod * Version (Residual)	14	557.1115	8.78	0.0001
Prod * Order	8	60.4733	1.67	0.1016
Trans * Order	2	1.2788	0.14	0.2500
Prod * Version * Order (Residual)	14	84.6541	1.33	0.2500
Error Sub (Prod)	1504	6816.5729		

TABLE III - 11
ANALYSIS OF VARIANCE FOR FAMILIARITY DEPENDENT MEASURE
NONLINEAR UNITY SCORE APPROACH

Source	DF	Type III SS	F-Value	P > F
<u>Between Subject Effects</u>				
Intercept	1	9450.3839	254.47	0.0001
Version	2	276.1947	3.72	0.0261
Order	1	85.6300	2.31	0.1306
Version * Order	2	88.3924	1.19	0.3066
Error Sub (Version * Order)	181	6721.8569		
<u>Within Subject Effects</u>				
Product	8	2197.4792	28.33	0.0001
Trans	2	395.5843	20.40	0.0001
Prod * Version	14	1341.7119	9.88	0.0001
Prod * Order	8	438.9539	5.66	0.0001
Trans * Order	2	9.8527	0.51	0.2500
Prod * Version * Order (Residual)	14	198.696	1.46	0.2500
Error Sub (Prod)	1448	14040.3723		

Derived Responses

The remaining three hypotheses concerned the effect of aesthetic response on derived responses (i. e., attitude, quality, and price). It was hypothesized that aesthetic responses would influence derived responses and thus products that received more positive aesthetic ratings (i. e., products that exhibit unity) would also be rated higher with regard to liking (i. e., attitude), quality (i. e., perceived quality), and price (i. e., expected price) than would products that received less positive aesthetic ratings. The critical tests for examining these hypotheses are the same as the critical test for examining the influence of unity on aesthetic response except the dependent measures reflect

the construct of interest (e. g., attitude, perceived quality). Thus, if the products that received higher (more positive) aesthetic response ratings also receive significantly higher ratings with respect to scales measuring derived responses than this would provide at least some evidence of the broader influence that product aesthetics may exert on consumer behavior.

The analyses and findings concerning attitude, perceived quality, and price expectations will be discussed together since the analyses employed were identical for all three and the results were for the most part parallel. The means for the liking, quality, and price ratings are presented in Table III-12, Table III-13, and Table III-14, respectively. For the most part, the pattern of the means that was observed for the liking and quality derived responses was similar to the pattern observed in the case of aesthetic response. That is, both the Unity/Prototypical and the Unity/Atypical conditions received higher ratings than either of the two Non-unity/Atypical conditions. The pattern observed for the price ratings was somewhat different. The means for the price ratings across stimulus sets contained quite a number of instances where the Unity/Typical (++) product version was the lowest rated version (this was true for eleven of the twenty-seven stimulus sets). In twenty of the stimulus sets the Unity/Atypical (--) was the highest rated product version. One possible explanation for this is that subjects may attribute the unusual or novel appearance of the atypical product versions to expensive "designer

TABLE III - 12
MEAN LIKING RATINGS AND UNITY SCORES

Product	(++)	(+-)	(-+)	(-)	U _L	U _N
1. Bathroom scale						
Sh	6.31	5.92** ^a	5.06**	4.92**	0.12	0.83***
Tr	4.89	5.91	5.22	6.49	0.13+ ^b	1.71***
Tx	4.47	6.44	5.25	5.28	-0.97	0.56+
2. TV Remote Control						
Sh	5.37	4.58*	5.09	5.20	0.40*	1.42***
Tr	4.33	4.73	5.44	7.09	0.62**	2.74***
Tx	5.97	4.61**	5.00**	5.74	1.10**	1.68***
3. Flashlight						
Sh	7.08	4.09***	3.41***	3.47***	1.53***	0.78**
Tr	6.16	3.95***	4.53***	4.26***	0.96***	0.77**
Tx	6.72	2.92***	2.46***	5.48**	3.36***	3.23***
4. Lamp						
Sh	6.56	5.95*	4.34***	4.53***	0.37**	0.66**
Tr	5.08	4.80	6.02	6.25	0.26*	1.61**
Tx	5.36	5.30	4.98	6.73	0.91**	2.58***
5. Refrigerator						
Sh	6.97	2.06***	2.46***	3.98***	3.25***	2.14***
Tr	6.13	4.14***	4.20***	6.05	1.96***	2.55***
Tx	6.89	2.31***	2.37***	3.40***	2.72***	1.36***
6. Telephone						
Sh	5.98	3.03***	4.20***	3.63***	1.19***	0.92**
Tr	6.02	5.65+	4.29***	4.40***	0.26*	0.44**
Tx	6.05	5.26**	4.97**	6.42	1.10***	1.76***

TABLE III - 12 -- continued
MEAN LIKING RATINGS AND UNITY SCORES

Product	(++)	(+-)	(-+)	(--)	U _L	U _N
7. Hair dryer						
Sh	7.40	5.45	3.11	3.50	1.09***	0.71**
Tr	5.22	5.37	5.14	5.74	0.24+	1.14***
Tx	6.97	3.06	2.80	5.61	3.31***	3.23***
8. Dresser						
Sh	5.45	5.26	4.74	5.86	0.65**	1.85***
Tr	5.89	3.38	3.69	7.03	2.90***	3.85***
Tx	6.18	3.84	4.68	4.71	1.18**	1.56**
9. Clock						
Sh	6.44	2.58	2.81	5.13	3.10***	2.75***
Tr	5.63	3.74	3.79	4.81	1.39***	1.45***
Tx	5.69	3.85	3.51	5.75	2.03***	2.38***
Total ^c	5.97	4.38	4.21	5.24	1.30***	1.73***

a Indicates that the difference for a change in a feature from prototypical to atypical was significant based on the t-statistic computed for each product/transformation pair.

b Indicates unity score is significantly different from zero.

c Statistical significance based on ANOVA results reported in the text.

*** Indicates differences significant at $p < .001$ in one-tailed-tests.

** Indicates differences significant at $p < .01$ in one-tailed-tests.

* Indicates differences significant at $p < .05$ in one-tailed-tests.

† Indicates differences significant at $p < .1$ in one-tailed-tests.

TABLE III - 13
MEAN QUALITY RATINGS AND UNITY SCORES

Product	(++)	(+-)	(-+)	(--)	U_L	U_N
1. Bathroom scale						
Sh	5.28	5.03	5.25	5.39	0.16* ^b	0.92***
Tr	4.53	5.90	4.65	6.11	0.05	1.50***
Tx	4.35	5.81	5.02	5.65	-0.44	0.95***
2. TV Remote Control						
Sh	5.24	5.26	5.34	5.37	-0.00	0.68**
Tr	4.03	5.18	5.48	6.66	-0.03	1.77***
Tx	5.41	5.18	5.23	5.66	0.31+	0.77**
3. Flashlight						
Sh	5.61	4.95** ^a	4.90*	5.02*	0.42*	0.70**
Tr	5.07	4.70+	4.69*	5.00	0.34**	0.69**
Tx	5.42	4.26**	4.16**	5.68	1.24***	1.83***
4. Lamp						
Sh	5.59	5.43	5.03*	5.08+	0.08	0.53**
Tr	4.39	4.84	5.53	5.82	-0.09	1.26***
Tx	4.23	5.39	4.87	6.45	0.19	1.91***
5. Refrigerator						
Sh	6.02	3.97***	4.45***	5.03**	1.33***	1.24***
Tr	5.24	4.73*	4.58*	5.66	0.79***	1.46***
Tx	6.36	4.74***	4.85***	5.25**	1.00***	0.85***
6. Telephone						
Sh	5.55	4.71**	4.85**	4.77**	0.36*	0.37*
Tr	5.23	5.34	4.79*	4.56**	-0.17	0.06
Tx	5.55	5.33	5.13*	5.89	0.53**	1.11***

TABLE III - 13 -- continued
MEAN QUALITY RATINGS AND UNITY SCORES

Product	(++)	(+-)	(-+)	(--)	U_L	U_N
7. Hair dryer						
Sh	6.39	5.39**	4.57***	4.59***	0.50**	0.48*
Tr	4.40	5.08	5.22	5.63	-0.18	0.82**
Tx	5.82	4.00***	4.03***	5.81	1.77***	2.05***
8. Dresser						
Sh	5.05	5.29	5.26	5.95	0.22*	1.32***
Tr	4.81	4.34*	4.32*	6.52	1.29***	2.38***
Tx	5.18	4.70*	4.75	5.64	0.63**	1.44***
9. Clock						
Sh	5.13	3.53***	3.74***	4.84	1.32***	1.57***
Tr	4.64	4.10**	4.20*	4.61	0.43*	0.69**
Tx	4.87	3.98***	4.19**	4.74	0.73***	0.92***
Total ^c	5.16	4.86***	4.78***	5.46	0.48***	1.12***

- a Indicates that the difference for a change in a feature from prototypical to atypical was significant based on the t-statistic computed for each product/transformation pair.
- b Indicates unity score is significantly different from zero.
- c Statistical significance based on ANOVA results reported in the text.
- *** Indicates differences significant at $p < .001$ in one-tailed-tests.
- ** Indicates differences significant at $p < .01$ in one-tailed-tests.
- *
- + Indicates differences significant at $p < .05$ in one-tailed-tests.
- Indicates differences significant at $p < .1$ in one-tailed-tests.

TABLE III - 14
MEAN PRICE RATINGS AND UNITY SCORES

Product	(++)	(+-)	(-+)	(--)	U _L	U _N
1. Bathroom scale						
Sh	4.42	4.57	4.86	4.93	-0.04	1.02***
Tr	3.53	5.09	3.79	5.38	0.01	1.65***
Tx	3.66	5.74	4.38	5.36	-0.55	1.11***
2. TV Remote Control						
Sh	4.38	5.22	5.08	5.56	-0.18	0.91***
Tr	3.80	4.89	4.84	6.56	-0.31	2.08***
Tx	4.62	4.92	4.85	5.55	0.21	1.03***
3. Flashlight						
Sh	4.49	4.89	5.21	5.46	-0.10	0.91***
Tr	4.62	4.33+ ^a	4.68	4.57	0.06	0.47*
Tx	4.34	4.14	4.17	5.09	0.55** ^b	1.17***
4. Lamp						
Sh	4.45	4.95	5.10	5.27	-0.13	0.90***
Tr	3.53	4.52	4.95	5.28	-0.32	1.05***
Tx	3.80	4.82	4.49	5.74	0.07	1.54***
5. Refrigerator						
Sh	5.58	4.81*	4.66**	5.89	0.99**	1.48***
Tr	5.07	4.84	4.93	6.25	0.72***	1.69***
Tx	5.50	4.58**	4.87*	5.10	0.57**	0.77**
6. Telephone						
Sh	5.26	5.11	5.03	5.84	0.44**	1.18***
Tr	4.85	4.97	4.25**	4.33	0.03	0.28*
	5.63	5.34	5.01**	6.14	0.69**	1.30***

TABLE III - 14 -- continued
MEAN PRICE RATINGS AND UNITY SCORES

Product	(++)	(+)	(-+)	(-)	U_L	U_N
7. Hair dryer						
Sh	5.17	4.58**	3.92**	4.28**	0.45**	0.75**
Tr	3.91	4.67	4.72	5.58	0.05	1.15***
Tx	5.03	4.44*	4.21**	5.87	1.08***	1.82***
8. Dresser						
Sh	4.30	4.67	5.39	5.98	0.11	1.62***
Tr	4.39	4.10	4.36	6.33	1.08***	2.25***
Tx	4.65	4.42	4.80	5.32	0.31*	1.14***
9. Clock						
Sh	4.61	3.09***	3.31***	4.39	1.24***	1.51***
Tr	3.90	3.33**	3.52+	3.92	0.46**	0.71**
Tx	4.09	3.20**	3.44**	3.94	0.68**	0.88***
Total ^c	4.50	4.60 ^c	4.55	5.33	0.29***	1.19***

- a Indicates that the difference for a change in a feature from prototypical to atypical was significant based on the t-statistic computed for each product/transformation pair.
- b Indicates unity score is significantly different from zero.
- c Statistical significance based on ANOVA results reported in the text.
- *** Indicates differences significant at $p < .001$ in one-tailed-tests.
- ** Indicates differences significant at $p < .01$ in one-tailed-tests.
- *
- + Indicates differences significant at $p < .05$ in one-tailed-tests.
- Indicates differences significant at $p < .1$ in one-tailed-tests.

"products" and thus relate novelty (atypicality) in general to the higher prices associated with such products.

The analysis of variance results for liking, quality, and price are reported in Table III-15 to Table III-23. For all three of the derived responses there was a significant effect of unity. In the case of attitude (i. e., liking ratings) the effect of unity (i. e., Factor A x Factor B interaction) was highly significant across all three variations of the dependent measure: rating scores $F(1,185) = 378.04$, $p < 0.0001$; Linear unity scores $F(1,185) = 378.04$, $p < .0001$; and pure-unity score $F(1,188) = 530.00$, $p < .0001$. That aesthetic responses would have a strong influence on attitudes is not too surprising since many conceptualizations of attitude maintain that attitudes contain an affective component or that affective responses are antecedents of attitudes (Ajzen 1989; Edwards 1990). The effect of unity on (perceived) quality was not as strong as it was for liking but it was still significant except in the analysis that utilized nonlinear unity scores where it was marginally significant: rating scores $F(1,179) = 83.54$, $p < .0001$; linear unity scores $F(1,179) = 83.54$, $p < .0001$; nonlinear unity scores $F(1,188) = 3.74$, $p < .0545$. The effect of unity on ratings of price was significant across all the dependent measure variations: rating scores $F(1,179) = 57.67$; linear unity scores $F(1,179) = 57.67$, $p < .0001$; nonlinear unity scores $F(1,188) = 398.57$, $p < .0001$.

Once again, the patterns of interactions observed among Products, Transformation type, and Order for these derived responses were the same as

TABLE III - 15
 ANALYSIS OF VARIANCE FOR LIKING DEPENDENT MEASURE
 RATING SCORE APPROACH

Source	DF	Type III SS	F-Value	P > F
<u>Between Subject Effects</u>				
Version	2	46.0270	1.66	0.1937
Order	1	27.3070	1.96	0.1627
Version * Order	2	124.4730	4.48	0.0126
Error Sub (Version * Order)	185	2571.1570		
<u>Within Subject Effects</u>				
Product	8	1223.6860	40.79	0.0001
Trans	2	166.7490	22.23	0.0001
Prod * Version (Residual)	14	547.9980	10.44	0.0001
Prod * Order	8	141.8833	4.73	0.0001
Trans * Order	2	7.1283	0.95	0.2500
Prod * Version * Order (Residual)	14	42.2361	0.80	0.2500
Error Sub (Product)	1480	5550.5546		
Feature A	1	350.7149	48.87	0.0001
A * Version	2	439.3120	30.61	0.001
A * Order	1	21.8458	3.04	0.0827
A * Version * Order	2	14.4999	1.01	0.3662
Error Sub (A)	185	1327.7566		
Feature B	1	136.4246	24.32	0.0001
B * Version	2	154.4816	13.77	0.0001
B * Order	1	36.0534	6.43	0.0121
B * Version * Order	2	25.8407	2.30	0.1028
Error Sub (B)	185	1037.9498		
A * B	1	2954.8430	378.04	0.0001
A * B * Version	2	95.1822	6.09	0.0027
A * B * Order	1	3.3147	0.42	0.5157
A * B * Version * Order	2	8.7269	0.56	0.5732
Error Sub (A * B)	185	1446.0027		
Prod * A * B	8	1289.1620	57.08	0.0001
Prod * A * B * Version	16	895.3401	19.82	0.0001
Prod * A * B * Order	8	81.3623	3.60	0.0004
Prod * A * B * Version * Order	16	74.3545	1.65	0.0509
Error Sub (Prod * A * B)	1480	4178.2312		

TABLE III - 16
ANALYSIS OF VARIANCE FOR LIKING DEPENDENT MEASURE
LINEAR UNITY SCORE APPROACH

Source	DF	Type III SS	F-Value	P > F
<u>Between Subject Effects</u>				
Intercept	1	11819.3718	378.04	0.0001
Version	2	380.7288	6.09	0.0027
Order	1	13.2590	0.42	0.5157
Version * Order	2	34.9076	0.56	0.5732
Error Sub (Version * Order)	185	5784.0106		
<u>Within Subject Effects</u>				
Product	8	5156.6480	57.08	0.0001
Trans	2	537.0898	23.78	0.0001
Prod * Version (Residual)	14	3044.2706	19.26	0.0001
Prod * Order	8	325.4491	3.60	0.0004
Trans * Order	2	32.1250	1.42	0.2500
Prod * Version * Order (Residual)	14	265.2929	1.67	0.1000
Error Sub (Prod)	1480	16712.9249		

were discussed for aesthetic response. Individual t-tests for each of the stimulus sets for all three of the derived responses were conducted to ensure that the effect of unity was significant and in the proper direction across stimulus sets (refer to Tables III-12, 13, and 14).

The three hypotheses concerning the influence of aesthetic response on derived responses all seem to be supported. The products that received higher beauty or aesthetic ratings (i. e., products exhibiting unity) also received higher ratings for liking, quality, and price than did products that received lower aesthetic ratings (i. e., products that did not exhibit unity). Although there seems to be a reduction in the magnitude of the effect of the unity design factor on the derived responses of perceived quality and expected price (as compared with attitudes) the findings do seem to provide evidence that design

TABLE III - 17
ANALYSIS OF VARIANCE FOR LIKING DEPENDENT MEASURE
NONLINEAR UNITY DIFFERENCE SCORE APPROACH

Source	DF	Type III SS	F-Value	P > F
<u>Between Subject Effects</u>				
Intercept	1	5141.7559	530.00	0.0001
Version	2	428.1894	22.07	0.0001
Order	1	12.1427	1.25	0.2647
Version * Order	2	41.8216	2.16	0.1187
Error Sub (Version * Order)	188	1823.8659		
<u>Within Subject Effects</u>				
Product	8	352.3060	9.50	0.0001
Trans	2	143.3854	15.47	0.0001
Prod * Version (Residual)	14	506.0161	7.80	0.0001
Prod * Order	8	146.6168	3.95	0.0001
Trans * Order	2	52.9295	5.71	0.0100
Prod * Version * Order (Residual)	14	100.1989	1.54	0.1000
Error Sub (Prod)	1504	6971.6544		

factors may indirectly influence "non-aesthetic" product evaluations by means of aesthetic response.

TABLE III - 18
ANALYSIS OF VARIANCE FOR QUALITY DEPENDENT MEASURE
RATING SCORE APPROACH

Source	DF	Type III SS	F-Value	P > F
<u>Between Subject Effects</u>				
Version	2	9.127	0.39	0.6782
Order	1	1.608	0.14	0.7116
Version * Order	2	32.987	1.41	0.2477
Error Sub (Version * Order)	179	2098.955		
<u>Within Subject Effects</u>				
Product	8	460.3010	15.94	0.0001
Trans	2	8.4585	1.17	0.2500
Prod * Version (Residual)	14	97.9144	1.94	0.0250
Prod * Order	8	84.6168	2.93	0.0030
Trans * Order	2	0.8922	0.12	0.2500
Prod * Version * Order (Residual)	14	102.4896	2.03	0.0250
Error Sub (Product)	1432	5170.5778		
Feature A	1	19.6599	4.43	0.0368
A * Version	2	111.1728	12.52	0.0001
A * Order	1	7.9716	1.80	0.1820
A * Version * Order	2	0.4826	0.50	0.9471
Error Sub (A)	179	794.7515		
Feature B	1	57.4549	15.22	0.0001
B * Version	2	81.5176	10.80	0.0001
B * Order	1	0.5777	0.15	0.6961
B * Version * Order	2	10.9047	1.44	0.2386
Error Sub (B)	179	675.6261		
A * B	1	401.5016	83.54	0.0001
A * B * Version	2	22.2117	2.31	0.1021
A * B * Order	1	0.0029	0.00	0.9804
A * B * Version * Order	2	2.0149	0.21	0.8111
Error Sub (A * B)	179	860.2664		
Prod * A * B	8	233.0967	15.44	0.0001
Prod * A * B * Version	16	245.1410	8.12	0.0001
Prod * A * B * Order	8	25.6402	1.70	0.0943
Prod * A * B * Version * Order	16	25.6986	0.85	0.6271
Error Sub (Prod * A * B)	1432	2702.5612		

TABLE III - 19
ANALYSIS OF VARIANCE FOR QUALITY DEPENDENT MEASURE
LINEAR UNITY SCORE

Source	DF	Type III SS	F-Value	P > F
<u>Between Subject Effects</u>				
Intercept	1	1606.0063	83.54	0.0001
Version	2	88.8466	2.31	0.1021
Order	1	0.0116	0.00	0.9804
Version * Order	2	8.0595	0.21	0.8111
Error Sub (Version * Order)	188	3441.0657		
<u>Within Subject Effects</u>				
Product	8	932.3869	15.44	0.0001
Trans	2	172.8437	11.45	0.0001
Prod * Version (Residual)	14	807.7205	7.64	0.0001
Prod * Order	8	102.5606	1.70	0.0943
Trans * Order	2	12.8424	0.85	0.2500
Prod * Version * Order (Residual)	14	89.9521	0.85	0.2500
Error Sub (Prod)	1432	10810.2448		

TABLE III - 20
ANALYSIS OF VARIANCE FOR QUALITY DEPENDENT MEASURE
NONLINEAR UNITY SCORE

Source	DF	Type III SS	F-Value	P > F
<u>Between Subject Effects</u>				
Intercept	1	24.6230	3.79	0.0545
Version	2	243.5989	18.52	0.0001
Order	1	2.4103	0.37	0.5457
Version * Order	2	3.1163	0.24	0.7893
Error Sub (Version * Order)	188	1236.4512		
<u>Within Subject Effects</u>				
Product	8	195.0827	7.91	0.0001
Trans	2	180.0369	29.21	0.0001
Prod * Version (Residual)	14	270.5720	6.27	0.0001
Prod * Order	8	67.3174	2.73	0.0054
Trans * Order	2	5.9871	0.97	0.2500
Prod * Version * Order (Residual)	14	65.0598	1.51	0.1000
Error Sub (Prod)	1504	4635.4572		

TABLE III - 21
ANALYSIS OF VARIANCE FOR PRICE DEPENDENT MEASURE
RATING SCORE APPROACH

Source	DF	Type III SS	F-Value	P > F
<u>Between Subject Effects</u>				
Version	2	48.662	1.55	0.2149
Order	1	28.494	1.82	0.1795
Version * Order	2	45.063	1.44	0.2405
Error Sub (Version * Order)	179	2808.080		
<u>Within Subject Effects</u>				
Product	8	1089.9719	38.16	0.0001
Trans	2	58.7083	8.22	0.0010
Prod * Version (Residual)	14	137.2604	2.75	0.0001
Prod * Order	8	182.0655	6.37	0.0001
Trans * Order	2	8.0139	1.12	0.2500
Prod * Version * Order (Residual)	14	76.0911	1.52	0.1000
Error Sub (Product)	1432	5112.3283		
Feature A	1	250.9383	56.16	0.0001
A * Version	2	83.3609	9.33	0.0001
A * Order	1	1.9605	0.44	0.5086
A * Version * Order	2	4.8154	0.54	0.5844
Error Sub (A)	179	799.8424		
Feature B	1	321.3547	86.02	0.0001
B * Version	2	130.0014	17.40	0.0001
B * Order	1	2.3247	0.62	0.4312
B * Version * Order	2	11.9936	1.61	0.2037
Error Sub (B)	179	668.6915		
A * B	1	193.1558	57.67	0.0001
A * B * Version	2	26.2598	3.92	0.0216
A * B * Order	1	0.0024	0.00	0.9785
A * B * Version * Order	2	4.2203	0.63	0.5337
Error Sub (A * B)	179	599.4864		
Prod * A * B	8	200.3073	15.86	0.0001
Prod * A * B * Version	16	129.5848	5.13	0.0001
Prod * A * B * Order	8	9.5617	0.76	0.6409
Prod * A * B * Version * Order	16	27.3044	1.08	0.3680
Error Sub (Prod * A * B)	1432	2260.7715		

TABLE III - 22
ANALYSIS OF VARIANCE FOR PRICE DEPENDENT MEASURE
LINEAR UNITY SCORE

Source	DF	Type III SS	F-Value	P > F
<u>Between Subject Effects</u>				
Intercept	1	772.6232	57.67	0.0001
Version	2	105.0393	3.92	0.0216
Order	1	0.0098	0.00	0.9785
Version * Order	2	16.8810	0.63	0.5337
Error Sub (Version * Order)	179	2397.9457		
<u>Within Subject Effects</u>				
Product	8	801.2291	15.86	0.0001
Trans	2	24.3032	1.92	0.2500
Prod * Version (Residual)	14	494.0359	5.59	0.0010
Prod * Order	8	38.2466	0.76	0.6409
Trans * Order	2	1.6577	0.13	0.2500
Prod * Version * Order (Residual)	14	107.5598	1.22	0.2500
Error Sub (Prod)	1432	9043.0861		

TABLE III - 23
ANALYSIS OF VARIANCE FOR PRICE DEPENDENT MEASURE
NONLINEAR UNITY SCORE

Source	DF	Type III SS	F-Value	P > F
<u>Between Subject Effects</u>				
Intercept	1	2557.21486	398.57	0.0001
Version	2	188.1044	14.66	0.0001
Order	1	7.6367	1.19	0.2767
Version * Order	2	0.9127	0.07	0.9314
Error Sub (Version * Order)	188	1206.1973		
<u>Within Subject Effects</u>				
Product	8	89.9727	4.40	0.0001
Trans	2	3.6682	0.71	0.2500
Prod * Version (Residual)	14	86.8686	2.43	0.0100
Prod * Order	8	39.4494	1.93	0.0519
Trans * Order	2	8.2444	1.61	0.2500
Prod * Version * Order (Residual)	14	47.5262	1.33	0.2500
Error Sub (Prod)	1504	3842.0345		

Summary

Overall, the results strongly support the hypothesis of a positive effect of unity on aesthetic responses (i. e., H1). The Factor A and Factor B interaction (i. e., unity main effect) was significant and this was shown to be the case across product categories and across three different types of product transformations. An effect of prototypicality (H2) on aesthetic response was indicated, but there was not support for the moderate schema incongruity hypotheses (H3 and H4).

The favorable aesthetic responses generated by consistency with the unity visual organization principle was shown to carry over into subjects' attitudes, perceptions of quality, and price expectations for products (i. e., H7, H8, and H9). The Feature A x Feature B interaction was significant for all three derived responses. In addition, unity was shown to influence subjects' feelings of familiarity (i. e., perceived familiarity). Although not predicted, a novelty effect on price expectations seemed to be indicated by the results (H5). These results are summarized in Figure III-4. In Figure III-4 it can be seen that the Unity/Atypical product (--) is always rated higher than the Non-unity/Atypical products [Note: MAX refers to the more highly rated of the two Non-unity/Atypical products and MIN refers to the Non-unity/Atypical product that received the lowest ratings].

These results clearly suggest that the unity design factor can significantly influence both aesthetic responses and non-aesthetic product evaluations and thus play an important role in determining consumer behavior. The replication across the nine product categories demonstrates that the effects observed are quite robust. Furthermore, the ability to produce

these effects using three very different types of (product) transformations underscores the fact that unity can (and does) have broad application as a design factor.

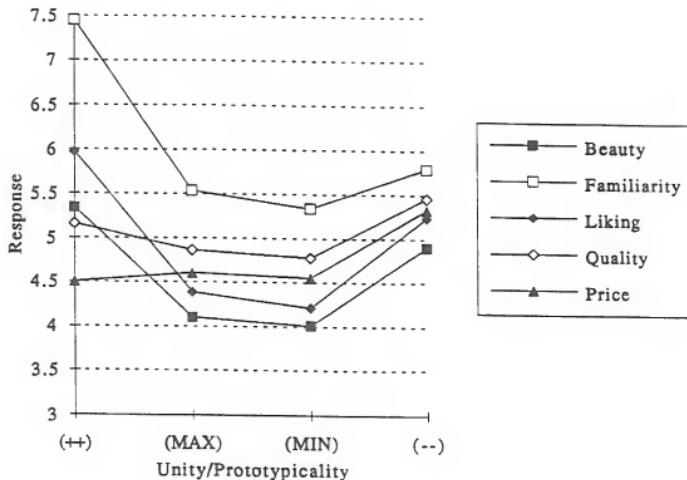


FIGURE III-4
MEAN AESTHETIC AND DERIVED RESPONSES

CHAPTER IV EXPERIMENT 2

Overview

Experiment 1 investigated the effects of unity and prototypicality on aesthetic and derived responses by presenting subjects with all four versions of a stimulus set simultaneously and asking them to rate the versions on semantic differential scales that measured the constructs of interest. This experiment is a between-subjects replication of Experiment 1 in which subjects evaluate only one design from each stimulus set. In this study, product versions were evaluated without the context of other product versions from the same product category. The between-subjects design of this experiment also serves to reduce the possible demand artifacts that maybe involved in a within-subjects experimental design that tests the influence of unity and prototypicality on aesthetic responses, attitudes, quality perceptions, and price expectations.

Experimental Design

A sub-set of the stimuli that were employed in Experiment 1 were used in this experiment. One transformation was chosen from each product category. The chosen transformation was the one with the strongest linear

unity score effect in Experiment 1. Although all nine product categories were included, the bathroom scales stimulus set was omitted from subsequent analyses for two reasons. First, this simplified the analyses of the results. Second, this stimulus set was the only reversal of the unity effect observed in Experiment 1. Each product category was represented and an effort was made to select an equal number of each of the three types of manipulations (i. e., shape, texture, and trim). The nine stimulus sets that were employed were the bathroom scale/texture¹¹, T. V. Remote Control/trim, flashlight/trim, lamp/texture, refrigerator/shape, telephone/shape, hair dryer/texture, dresser/trim, and clock/shape.

The overall design of the experiment was a 2(Feature A) x 2(Feature B) x 8(Products) mixed factorial design. Just as in the first experiment the manipulation of Features A and B resulted in the manipulation of prototypicality and unity. In this experiment, however, each cell of the crossed Feature A and B factors [i. e., product versions: Unity/Prototypical (++), Non-Unity/Atypical (+-), Non-Unity/Atypical (-+), Unity/Atypical (--)] was contained in one of four questionnaire versions. That is, each questionnaire contained all eight product categories (and the extra product); each subject received one

¹¹ This product had proven to be problematic in Experiment 1 but was included for the purpose of maintaining continuity between the product presentations of the two experiments.

of four questionnaire versions and each questionnaire version contained one cell (i. e., product variation, e. g., Unity/Prototypical) of the 2(Feature A)x2(Feature B) manipulation from each of the product categories (see Appendix D for a diagram of this design). The product versions (e. g., Unity/Prototypical) were distributed evenly throughout the four versions of the questionnaire. Although the three types of transformations were represented across the eight stimulus sets, transformation type was not treated as a factor in this design. The order in which the stimulus products were presented was reversed for half of the subjects.

Experimental Procedure

Two-hundred and forty volunteer subjects enrolled in the Introductory Marketing course at the University of Florida participated in this experiment. The procedure for this experiment was the same as the procedure for Experiment 1 except that in each of the four questionnaire versions subjects saw and rated only one version of each product for each of the eight stimulus sets. The dependent measures were the same measures that were used in Experiment 1.

Results and Discussion

The manipulation check for the effects of a change in either Feature A or Feature B on aesthetic responses indicated that, as expected, there was an overall reduction in the ratings of product appearance as compared with the prototypical product version. The average effect of a change in either of these features was weaker than they were in Experiment 1 with the average effect of a change in Feature A being -.425 and Feature B -.281. The effect of a change in Feature A or Feature B from the category prototype for all eight stimulus sets are shown in Table IV-1. In four of the eight cases the change

TABLE IV - 1
MANIPULATION CHECK

Product	Feature A	Feature B
1. T.V. Remote - Tr	- 0.001	0.343
2. Flashlight - Tr	0.096	- 0.059
3. Lamp - Tx	- 0.862	- 0.414
4. Refrigerator - Sh	- 1.352	- 0.827
5. Telephone - Sh	- 0.687	- 0.327
6. Hair dryer - Tx	- 0.488	- 0.798
7. Dresser - Tr	- 0.171	0.019
8. Clock - Sh	0.064	- 0.182
Mean effect of change across products	-0.425	- 0.281

of either Feature A or Feature B resulted in a lower beauty rating. The effects of a change in the product features were mixed for the remaining four stimulus sets. Of these four mixed-effects stimulus sets only one (T. V. remote - trim) is consistent with the manipulation check results of Experiment 1. The fact that in three instances feature manipulations that had resulted in a reduction of beauty ratings in Experiment 1 resulted in slightly increased ratings in Experiment 2 would seem to indicate that the strength of the manipulations is, not surprisingly, affected by the context of other product variations (i. e., whether or not the products being rated can be compared to other product variations or brands).

The Influence of Unity and Prototypicality on Aesthetic and Derived Responses

As was the case in Experiment 1, the critical tests concerning the influence of unity and prototypicality on aesthetic and derived responses involves the Feature A x Feature B interaction (i. e., a main effect of unity). A significant Feature A x Feature B interaction across products would indicate that changes of product features that are made in a way that increases unity [i. e., Unity/Atypical (--)] lead to more positive aesthetic (and derived) responses. Such a result is inconsistent with the prototypicality explanation of aesthetic response which predicts that product versions that are more similar to the category prototype will receive more positive ratings.

Analysis

The data were analyzed using a mixed ANOVA with between-subjects factors of questionnaire Version and Order. Products was a within-subjects factor. The analysis was performed on product ratings since the between-subjects design precluded the use of the unity score approaches at the individual level. Unity scores (i. e., linear and nonlinear scores) may be calculated using the mean product ratings at the aggregate level. However, a nonlinear unity score calculated in this way will tend to underestimate the effect of unity since the minimum case (i. e., the lowest rated Non-unity/Atypical product variation) may not be the same for each subject. Thus, the minimum Non-unity/Atypical mean will not necessarily be an aggregation of subjects' nonlinear unity scores. This means that the nonlinear unity scores for this between-subjects experiment represent a more conservative test of the influence of unity than the nonlinear unity scores in Experiment 1. The more conservative nonlinear unity scores reported in this experiment will be distinguished from those reported earlier by a prime (') mark.

Hypothesis Testing

The means for the beauty ratings for each of the eight stimulus sets are presented in Table IV-2. The analysis of variance for factors affecting beauty ratings is presented in Table IV-3. The analysis shows that overall the interaction between Features A and B was significant, $F(1,1610) = 6.4238$,

TABLE IV - 2
MEANS FOR BEAUTY RATINGS

Product	Unity/ Typical (++)	Non-Unity/ Atypical (+)	Non-Unity/ Atypical (-)	Unity/ Atypical (--)	U_L	U_N'
1. T. V. Remote - Tr	4.36	4.36	4.70	3.88	-0.41	-0.48
2. Flashlight - Tr	4.85	4.95	4.79	5.07	0.09	0.28
3. Lamp - Tx	5.00	4.14** ^a	4.59**	4.98	0.63** ^b	0.84
4. Refrigerator - Sh	4.16	2.80***	3.33*	3.41		0.61
5. Telephone - Sh	3.97	3.28	3.64	3.62	0.72**	0.34
6. Hair dryer - Tx	5.23	4.74*	4.43	4.23	0.35	-0.20
7. Dresser - Tr	4.03	3.86	4.05	4.12	0.15	0.26
8. Clock - Sh	3.03	3.10	2.85	2.71	0.12	-0.14
Total	4.33	3.90***	4.05**	4.00**	0.19*	0.19

^a Indicates significance from Prototypical product.

^b Indicates significance of the differences between Unity/Atypical and Non-unity/Atypical conditions.

*** Indicates differences significant at $p < .001$.

** Indicates differences significant at $p < .01$.

* Indicates differences significant at $p < .05$.

+ Indicates differences significant at $p < .10$.

$p < .025$. The linear unity scores formed from the mean product ratings indicated that six of the eight stimulus sets were in the expected direction (i.e., positive). The "mean" nonlinear unity scores indicated that five of the eight stimulus sets were in the expected direction. Follow-up tests for each product indicated that individually only two products were significant [Lamp $F(1,233) = 8.85$, $p < .0032$; Refrigerator $F(1,233) = 7.74$, $p < .0058$]. However, the fact

TABLE IV - 3
ANALYSIS OF VARIANCE FOR BEAUTY DEPENDENT MEASURE

Source	DF	Type III SS	F-Value	P > F
<u>Between Subject Effects</u>				
Version	3	10.8722	0.66	0.5788
Order	1	37.9800	6.89	0.0092
Version * Order	3	17.0346	1.03	0.3798
Error Sub (Version * Order)	230	1267.2469		
<u>Within Subject Effects</u>				
Product	7	814.4207	42.51	0.0001
Feature A	1	4.0309	1.47	0.2500
Feature B	1	26.6562	9.73	0.0100
A * B	1	17.5812	6.42	0.0250
Prod * Version	18	105.3644	2.13	0.0100
Prod * Order	7	42.3589	2.24	0.0285
A * Order	1	0.6343	0.23	0.2500
B * Order	1	1.7413	0.64	0.2500
A * B * Order	1	2.7135	0.99	0.2500
Prod * Version * Order	18	51.2698	1.04	0.2500
Error Sub (Product)	1610	4406.5316		

that this interaction was significant for the analysis of all the products indicates that consistency with the unity visual organization principle is positively related to aesthetic response.

The ANOVA for the ratings of product beauty also indicates that there were significant effects of Order and Product as well as a significant Products x Version interaction. These effects were addressed in the discussion of Experiment 1 and the explanation of each of them is basically the same for this experiment. The effect of Products reflects the differential strengths of the Feature A and Feature B manipulations as they were adapted and applied to

each product category. An examination of the manipulation check for the impact of changes in product features A and B on beauty ratings (refer to Table IV-1) reveals that there are differences in the strength of the manipulations across the eight products. This is also reflected in the interaction between Products and Version (i. e., cells of the crossed feature A and B "factors" of the design; e. g., Unity/Prototypical).

There were also significant order effects [Order F(1,230) = 6.89, $p < .0092$; Product * Order F(7,1610) = 2.24, $p < .0285$]. An examination of the means for products for each of the presentation orders suggests that as in Experiment 1, these effects may be attributable to subjects increasing acceptance of the use of simple drawings to depict products.

Derived Responses

The influence of unity and prototypicality on attitude, quality perceptions, and price expectations was also examined. The means for the liking, quality, and price ratings are presented in Table IV-4, Table IV-5, and Table IV-6, respectively. The patterns exhibited for the liking and quality means are very similar to the pattern exhibited by the beauty means that were presented in the preceding section. Interestingly, the pattern for the overall means for price expectations were similar to those observed in Experiment 1 with the Unity/Atypical (--) product versions being the most highly rated and the Unity/Prototypical (++) product versions being the lowest rated product.

TABLE IV - 4
MEANS FOR LIKING RATINGS

Product	Unity/ Typical (++)	Non-Unity/ Atypical (+)	Non-Unity/ Atypical (-+)	Unity/ Atypical (-)	U_L	U_N'
1. T. V. Remote	5.38	5.56	5.81	4.88	-0.56	-0.68
2. Flashlight	5.63	5.76	5.60*	6.12	0.20	0.52
3. Lamp	5.87	4.97 ^a	5.16*	5.89	0.82** ^b	0.92*
4. Refrigerator	5.07	3.65***	3.90**	3.89**		0.24
5. Telephone	4.50	3.91	4.47	4.12	0.71*	0.21
6. Hair dryer	6.36	5.21***	5.10	5.20	0.12	0.10
7. Dresser	4.82	4.35	4.57	4.58	0.63**	0.23
8. Clock	3.24	3.69	3.56	3.26	0.24	-0.30
Total	5.11	4.63***	4.77**	4.74**	0.22***	0.16

a Indicates significance from Prototypical product.

b Indicates significance of the differences between Unity/Atypical and Non-unity/Atypical conditions.

*** Indicates differences significant at $p < .001$.

** Indicates differences significant at $p < .01$.

*

+ Indicates differences significant at $p < .05$.

+ Indicates differences significant at $p < .10$.

The ANOVAs for the influence of unity and prototypicality on liking, quality, and price are presented in Table IV-7, Table IV-8, and Table IV-9, respectively.

The influence of unity (i. e., the Feature A x Feature B interaction) was significant for liking $F(1,1617) = 7.04$, $p < .001$, approached significance for quality $F(1,1603) = 3.17$, $p < .10$, and was not significant for price $F(1,1603) = .24$ $p > .25$.

TABLE IV - 5
MEANS FOR QUALITY RATINGS

Product	Unity/ Typical (++)	Non-Unity/ Atypical (+-)	Non-Unity/ Atypical (-+)	Unity/ Atypical (-)	U_L	U_N^*
1. T. V. Remote	5.26	5.28	5.50	5.00	-0.26	-0.28
2. Flashlight	5.13	5.29	5.24	5.13	-0.14	-0.11
3. Lamp	4.72	4.33 ^a	4.67	5.05	0.39 ^b	0.72
4. Refrigerator	4.76	4.45	4.09+	4.50	0.36	0.41
5. Telephone	4.72	4.31*	4.38*	5.09	0.56*	0.78
6. Hair dryer	5.85	5.47	5.38	5.15	0.08	-0.23
7. Dresser	4.30	4.03**	4.33	5.10	0.52*	1.07*
8. Clock	2.93	3.58	3.34	3.22	-0.39	-0.12
Total	4.71	4.59	4.62	4.78	0.14+	0.28

^a Indicates significance from Prototypical product.

^b Indicates significance of the differences between Unity/Atypical and Non-unity/Atypical conditions.

*** Indicates differences significant at $p < .001$.

** Indicates differences significant at $p < .01$.

* Indicates differences significant at $p < .05$.

+ Indicates differences significant at $p < .10$.

The linear and nonlinear unity scores for liking both indicated that the mean product ratings for six of the eight stimulus sets were in the expected direction (i. e., positive). Five of the eight stimulus sets displayed positive linear unity scores for quality ratings. Four of the nonlinear unity scores formed from the mean product ratings were positive. Although the unity scores for the price ratings indicated that five of the linear unity scores and six

TABLE IV - 6
MEANS FOR PRICE RATINGS

Product	Unity/ Typical (++)	Non-Unity/ Atypical (+-)	Non-Unity/ Atypical (-+)	Unity/ Atypical (- -)	U_L	U_N'
1. T. V. Remote	4.31	4.71	4.95	4.33	-0.51	-0.38
2. Flashlight	3.80	3.93	3.83	4.03	0.04	0.20
3. Lamp	3.51	3.59	3.72	4.03	0.12	0.44
4. Refrigerator	5.05	5.30	4.92	5.02	-0.08	0.10
5. Telephone	4.88	5.31	4.75	5.55	0.19	0.80
6. Hair dryer	4.57	4.67	4.29	4.64	0.13	0.35
7. Dresser	4.18	4.17	4.19	4.50	0.16	0.33
8. Clock	2.19	2.68	2.61	2.45	-0.33	-0.16
Total	4.06	4.29	4.16	4.32	-0.04	0.21

- a Indicates significance from Prototypical product.
- b Indicates significance of the differences between Unity/Atypical and Non-unity/Atypical conditions.
- c Indicates that the atypical condition was rated more favorably than the prototypical condition at the $p < .05$ level.
- *** Indicates differences significant at $p < .001$.
- ** Indicates differences significant at $p < .01$.
- * Indicates differences significant at $p < .05$.
- +

of the nonlinear unity scores were positive, these scores reflect the influence of the high ratings received by the Unity/Atypical product variations. Across the eight stimulus sets the Unity/Prototypical product variations tended to receive price ratings that were lower than those received by the Non-Unity/Atypical product variations. This pattern (i. e., novelty effect) is consistent with the results reported for Experiment 1. Follow-up tests for each

TABLE IV - 7
ANALYSIS OF VARIANCE FOR LIKING DEPENDENT MEASURE

Source	DF	Type III SS	F-Value	P > F
<u>Between Subject Effects</u>				
Version	3	34.3446	1.27	0.2844
Order	1	38.0624	4.23	0.0408
Version * Order	3	95.6050	3.54	0.0154
Error Sub (Version * Order)	231	2077.8006		
<u>Within Subject Effects</u>				
Product	7	1162.2629	47.72	0.0001
Feature A	1	6.2858	1.81	0.2500
Feature B	1	30.7590	8.84	0.0100
A * B	1	24.4887	7.04	0.0010
Prod * Version	18	160.0874	2.56	0.2500
Prod * Order	7	24.8918	1.02	0.4135
A * Order	1	0.6051	0.17	0.2500
B * Order	1	0.4279	0.12	0.2500
A * B * Order	1	14.6689	4.22	0.0500
Prod * Version * Order (Residual)	18	72.1990	1.15	0.2500
Error Sub (Product)	1617	5626.2035		

product indicated that individually three products were significant for the influence of unity on liking [Lamp $F(1,234) = 9.26$, $p < .0026$; Refrigerator $F(1,234) = 4.84$ $p < .0287$; Hair dryer $F(1,234) = 6.96$, $p < .0089$, and T. V. Remote was marginally significant $F(1,234) = 3.57$, $p < .0602$], two products were significant for the influence of unity on quality [Telephone $F(1,231) = 5.40$, $p < .0210$; Dresser $F(1,232) = 4.36$, $p < .0378$; and Lamp was marginally significant $F(1,232) = 3.20$, $p < .0747$], and none of the products was significant with respect to the influence of unity on price. Once again, significant effects

TABLE IV - 8
ANALYSIS OF VARIANCE FOR QUALITY DEPENDENT MEASURE

Source	DF	Type III SS	F-Value	P > F
<u>Between Subject Effects</u>				
Version	3	31.9286	2.16	0.0938
Order	1	52.2380	10.61	0.0013
Version * Order	3	26.4376	1.79	0.1498
Error Sub (Version * Order)	229	1127.2916		
<u>Within Subject Effects</u>				
Product	7	783.7063	37.16	0.0001
Feature A	1	1.0528	0.35	0.2500
Feature B	1	0.2176	0.07	0.2500
A * B	1	9.5530	3.17	0.1000
Prod * Version	18	83.3248	1.54	0.1000
Prod * Order	7	21.0434	1.00	0.4310
A * Order	1	2.7504	0.91	0.2500
B * Order	1	7.1185	2.36	0.2500
A * B * Order	1	17.3136	5.75	0.0250
Prod * Version * Order (Residual)	18	50.2271	0.93	0.2500
Error Sub (Product)	1603	4829.7360		

of Products and Order were observed as well as the significant interaction of Products and Version.

Although the effect of unity on quality and price was not significant in this case, these findings concerning derived responses are consistent with the findings reported in Experiment 1. In Experiment 1 there also seemed to be a reduction in the magnitude of the effect of the unity design factor on perceived quality and expected price. This reduction in the effect, coupled with the reduced influence of unity due to the removal of the context provided by

TABLE IV - 9
ANALYSIS OF VARIANCE FOR PRICE DEPENDENT MEASURE

Source	DF	Type III SS	F-Value	P > F
<u>Between Subject Effects</u>				
Version	3	11.7739	0.77	0.5127
Order	1	11.2379	2.20	0.1393
Version * Order	3	17.6058	1.15	0.3301
Error Sub (Version * Order)	229	1169.4883		
<u>Within Subject Effects</u>				
Product	7	1224.6204	73.91	0.0001
Feature A	1	1.6873	0.71	0.2500
Feature B	1	18.6191	7.87	0.0100
A * B	1	0.5761	0.24	0.2500
Prod * Version	18	43.3833	1.02	0.2500
Prod * Order	7	64.1632	3.87	0.0003
A * Order	1	0.0001	0.00	0.2500
B * Order	1	0.1359	0.06	0.2500
A * B * Order	1	0.3289	0.14	0.2500
Prod * Version * Order (Residual)	18	49.1493	1.15	0.2500
Error Sub (Product)	1603	3794.1377		

having all versions appear on the same page, could explain the lack of a significant unity effect for quality and price.¹² The alternative explanation, that the absence of a comparative context increases the importance of

¹² Partial omega squares (Keppel 1991, p. 223) were calculated in order to estimate the magnitude of the unity effect. The partial omega squares for the effect of unity on beauty ratings for Experiment 1 were .31 for the rating score and U_L approaches and .37 for the U_N score approach. The partial omega square for the effect of unity on ratings of product beauty for Experiment 2 was .006. Although these estimates indicate that the effect of unity is quite large in Experiment 1 and very small in Experiment 2, care should be taken in interpreting the importance of these effects. See Keppel (1991, pp. 66-68 and 224) for discussions concerning the importance of small effects and the difficulty of comparing the sizes of omega squared estimates.

prototypicality, seems unlikely since, if that were true, both of the non-unity/atypical (+-, -+) conditions should always be rated higher than the unity atypical (--) condition and that was not the case.

Perceived Familiarity

The relationship between unity and perceived familiarity was also examined in this experiment. The means for the familiarity ratings for each of the eight stimulus sets are presented in Table IV-10. The analysis of variance for the influence of unity on perceived prototypicality is presented in Table IV-11. In addition to the significant Product and Version (Residual) effects that have been discussed in the previous two sections, there is a significant interaction of Feature A and Feature B which suggests that unity can encourage feelings of perceived familiarity, $F(1,1610) = 28.76, p < .001$. The unity scores for the familiarity ratings indicated that five of the linear scores and six of the nonlinear unity scores were in the hypothesized direction. Follow-up tests conducted to examine the effect of unity on perceived familiarity for individual products indicated that the Refrigerator $F(1,233) = 33.17, p < .001$, Telephone $F(1,232) = 5.14, p < .0242$, and Clock $F(1,232) = 3.29, p < .0709$ were significant. Perceived familiarity may be particularly influenced by product shape since all three of these stimulus sets utilized the shape transformation. These results build on those of Experiment 1 to suggest that

TABLE IV - 10
MEANS FOR FAMILIARITY RATINGS

Product	Unity/ Typical (++)	Non- Unity/ Atypical (+-)	Non- Unity/ Atypical (+)	Unity/ Atypical (--)	U_L	U_N *
1. T. V. Remote	7.93	7.48	7.75	7.97	0.34	0.49
2. Flashlight	7.56	7.69	7.85	7.72	-0.13	0.03
3. Lamp	7.84	7.88	7.78	7.13	-0.35	-0.65
4. Refrigerator	8.45*** a	4.51***	5.77***	5.93***	2.05*** b	1.42**
5. Telephone	7.74	5.31	6.15	5.38***		0.07**
6. Hair dryer	7.85	7.43	7.46	7.62	0.83**	0.19
7. Dresser	7.54	7.21	7.27	6.82	0.29	-0.39
8. Clock	8.09	7.57	7.70	8.07	-0.06	0.50
Total	7.87	6.88***	7.22***	7.08***	0.43***	0.21

a Indicates significance from Prototypical product.

b Indicates significance of the differences between Unity/Atypical and Non-unity/Atypical conditions.

*** Indicates differences significant at $p < .001$.

** Indicates differences significant at $p < .01$.

* Indicates differences significant at $p < .05$.

+ Indicates differences significant at $p < .10$.

TABLE IV - 11
ANALYSIS OF VARIANCE FOR FAMILIARITY DEPENDENT MEASURE

Source	DF	Type III SS	F-Value	P > F
<u>Between Subject Effects</u>				
Version	3	121.7994	2.90	0.0358
Order	1	20.4949	1.46	0.2276
Version * Order	3	24.4360	0.58	0.6276
Error Sub (Version * Order)	230	3221.0752		
<u>Within Subject Effects</u>				
Product	7	841.7213	39.87	0.0001
Feature A	1	25.0684	8.31	0.0100
Feature B	1	151.9619	50.39	0.0010
A * B	1	86.7198	28.76	0.0010
Prod * Version	18	388.4214	7.16	0.0010
Prod * Order	7	8.7496	0.41	0.8938
A * Order	1	4.3303	1.44	0.2500
B * Order	1	7.4252	2.46	0.2500
A * B * Order	1	2.2846	0.76	0.2500
Prod * Version * Order (Residual)	18	71.5838	1.32	0.2500
Error Sub (Product)	1610	4885.5859		

perceived familiarity involves more than the recall of the features shared with the category prototype.

Summary

This experiment further examined the influence of unity and prototypicality on aesthetic and derived responses. The experiment employed a between-subjects design and thus the subjects evaluated the product versions without the benefit of the three other versions (i.e., reference points) of the stimulus set. The results of this experiment are summarized in Figure IV-1.

Even though rating product versions without the context of other versions reduced the magnitude of the effects, the influence of unity on aesthetic responses, attitudes, and perceived familiarity was still significant. The finding that the influence of unity on quality and price is not as strong as it is on the other responses is consistent with the findings of Experiment 1. Clearly, context (i. e., availability to compare product versions with other products in the same product category during the evaluation task) plays a role in moderating the influence of factors such as unity, but the findings presented here demonstrate that the unity effects are robust and that the influence of unity on product evaluations may be pervasive.

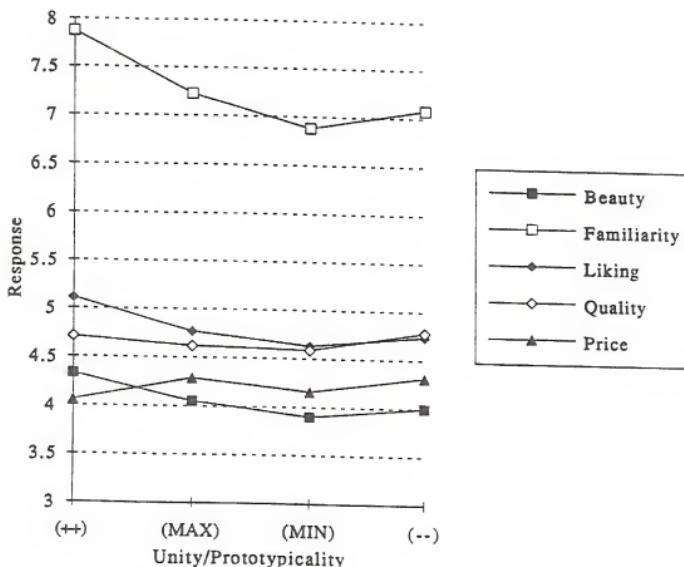


FIGURE IV-1
MEAN AESTHETIC AND DERIVED RESPONSES

CHAPTER V EXPERIMENT 3

Overview

Experiment 2 examined the influence of unity and prototypicality on aesthetic and derived responses when products were evaluated without the context of other product versions from the same product category. The experiment described in this chapter is a further investigation of the influence of product aesthetics on derived responses. In this experiment, subjects are provided with written product descriptions as well as drawings of the product versions that they are asked to rate. The experiment examines whether or not there is a moderating effect of the additional information (i. e., written product descriptions) on the influence of unity. It is expected that as in the experiment discussed earlier, unity will significantly influence subjects' ratings of products even though the evaluation task (i.e., rating product versions on scales measuring either liking or quality) does not explicitly require consideration of product appearance. In addition to demonstrating the influence of unity on derived responses, such a finding would also provide evidence of the importance of product aesthetics in general.

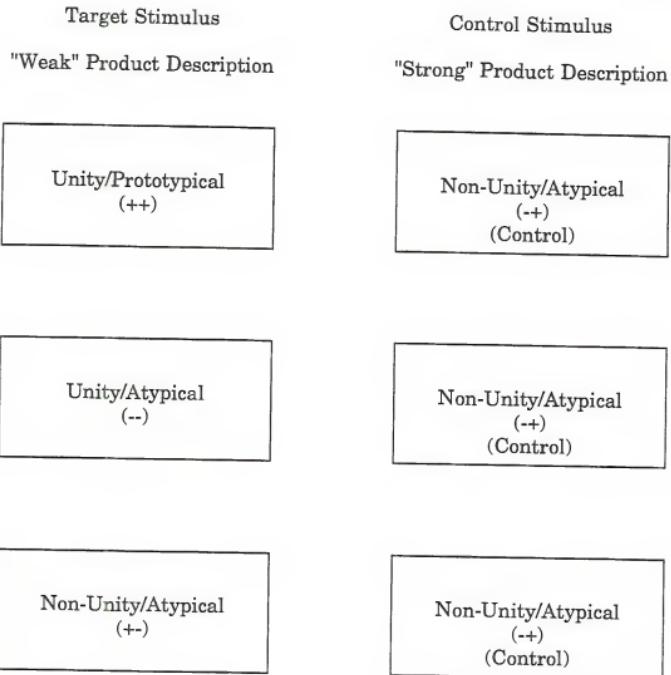
Stimulus Materials

The same sub-set of product drawings that were employed in Experiment 2 were used in this experiment and thus the manipulations of unity and prototypicality were the same as before. In this study, however, each product version [i. e., "target" product, either Unity/Prototypical (++), Unity/Atypical (--), or Non-unity/Atypical (+-)] was shown with a written product description and was rated against a "control" product. The control product was one of the Non-unity/Atypical product versions with a very favorable product description (the Non-unity/Atypical condition for each stimulus set that received higher beauty ratings was selected for use as the control product). The product descriptions developed for the target products were less favorable than the product descriptions for the control products. "Strong" (i. e., favorable) product descriptions dominated "weak" (i. e., less favorable) product descriptions on two of five or six attributes. The product descriptions, which were developed from catalog descriptions of products, were pilot tested (without the product drawings) in order to establish that the "strong" descriptions were, in fact, perceived as being stronger than the "weak" product descriptions. The strong and weak product descriptions are presented in Appendix E.

Experimental Design

The design of this experiment may be thought of as being a 2(product description: weak vs. strong) x 3(product appearance: Unity/Prototypical, Non-unity/Atypical, Unity/Atypical) x 9(Products).¹³ The comparison of interest, however, involves the differences between the three product appearance conditions with the weak product description. Since it is the differences in the ratings received by the products that were rated against (i. e., along with) the control product with its more favorable product description that are of interest, the study is actually a 1(target product with weak product description) x 3(product appearance: Unity/Prototypical, Non-unity/Atypical, Unity/Atypical) x 9 (Products) mixed design. The basic design of this experiment is shown in Figure V - 1. Product appearance was a between-subjects factor on any given product but was balanced across each of the three questionnaire versions that were administered. Product was a within-subjects factor since each subject did rate one of the three possible product pairings (control -- target) from each stimulus set. The dependent measure was either a scale measuring quality (High Quality/Low Quality) or a scale measuring general attitude (Like/Dislike). Subjects received only one of the two scales for all of the products that they rated. (This was to insure that there was no carry-over of one scale to the other). The position of the target and control products on each

¹³ Inclusion of the bathroom scale stimulus set simplified programming for the statistical analysis of this experiment.



Design: 1(Target product) x 3(Unity/Prototypical, Unity/Atypical, Non-unity/Atypical) x 9(Products) Mixed Design.

FIGURE V - 1
EXPERIMENT 3

page (left or right side) was reversed for half of the subjects and was balanced across questionnaire versions. The order in which the stimulus products (i. e., sets of target and control versions) were presented was also reversed for half of the subjects and this was confounded with the product position manipulation. Thus, the experiment was a 1(target product with weak product description) x 3(Product appearance: Unity/Prototypical, Non-unity/Atypical, Unity/Atypical) x 9(Product) x 2(position/order) design that was conducted for two dependent measures (quality or liking).

Experimental Procedure

Two-hundred and fifty seven subjects participated in this experiment. The procedure that was followed was very similar to the procedures employed in Experiments 1 and 2 except that in this study subjects were presented with two product versions (control and target) on a page and each version was accompanied with a product description. All conditions of this design were run concurrently.

Results and Discussion

It was predicted that the unity aspect of product appearance would influence subjects' ratings of products in the same way that it had in earlier experiments despite the addition of written product information. If this were the case, one would expect that the particular product drawings (i. e.,

appearance conditions: Unity/Prototypical, Non-unity/Atypical, Unity/Atypical) that were coupled with the target products (i. e., the weak product descriptions) would influence the ratings of the target products.¹⁴

Analysis

The design was analyzed using a mixed ANOVA to assess the effects of Unity, Product, Order/Position, and their possible interactions. Questionnaire Version and Order/Position were between-subjects factors. Subjects' ratings of the control products were averaged and used as a covariate in the analysis in order to reduce the error due to individual rating differences across subjects.

Hypothesis Testing

The critical test for examining whether or not the unity aspect of product appearance influences subjects' attitudes toward products and perceptions of product quality despite the presence of additional information involves the differences between the three target conditions. These conditions differ only with respect to the appearance of the product version (Unity/Prototypical, Non-unity/Atypical, Unity/Atypical) that is coupled with the weak product description. If the results are consistent with the findings

¹⁴ Coupling the appearance conditions with the weak product descriptions avoids ceiling effects which might otherwise occur if the appearance conditions had been coupled with the strong product descriptions.

of the previous two experiments, that is, products that exhibit unity are more highly rated than products that do not exhibit unity, then they would support the conclusion that the effect of unity on product evaluations is quite robust.

The means for the liking ratings are presented in Table V - 1 and the ANOVA for the effect of unity on subjects' attitudes toward the products is presented in Table V - 2. The analysis indicates that there is a significant effect of Cell, $F(2,960) = 4.52$, $p < .025$, which refers to the three target product versions (Unity/Prototypical, Non-unity/Atypical, or Unity/Atypical) seen by the subjects in each condition (i. e., questionnaire version) saw. The effect of unity is also present in the effect of Version, $F(2,120) = 3.43$, $p < .0357$, since the product version (i. e., Unity/Prototypical, Non-unity/Atypical, and Unity/Atypical) for each product category are contained in the three questionnaire versions. Contrasts between the different cells (i. e., product versions) of this design indicated that the difference between the mean for the Unity/Atypical products ($M = 6.06$) and the mean for the Non-unity/Atypical products ($M = 5.67$) was significant, $F(1,120) = 4.79$, $p < .0306$).¹⁵ Although the nonlinear unity scores calculated from the mean product ratings indicated that seven of the nine were in the expected (i. e., positive) direction, follow-up tests on the individual products indicated that the contrast between the

¹⁵ The difference between the means for the Unity/Prototypical products ($M = 5.90$) and the Unity/Atypical products ($M = 6.06$) was not significant.

TABLE V - 1
LIKING

Product	Unity/ Prototypical	Non-Unity/ Atypical	Unity/ Atypical	U_N'
1. Bathroom scale	5.52	5.86	6.40	0.54
2. T. V. Remote	6.30	6.02	6.40*a	0.38
3. Flashlight	5.57	5.49	5.98	0.49
4. Lamp	6.64	6.05	6.19	0.14
5. Refrigerator	5.37	4.36***a	6.55	2.19***b
6. Telephone	5.88	4.74**	5.40**	0.66
7. Hair dryer	5.79	7.00	5.93	-1.07
8. Dresser	6.14	5.29	6.00	0.71
9. Clock	5.93	6.23	5.71	-0.52
Total	5.90	5.67**	6.06	0.39*

a Indicates significance from Prototypical product.

b Indicates significance of the differences between Unity/Atypical and Non-unity/Atypical conditions.

*** Indicates differences significant at $p < .001$.

** Indicates differences significant at $p < .01$.

* Indicates differences significant at $p < .05$.

+ Indicates differences significant at $p < .10$.

TABLE V - 2
ANALYSIS OF VARIANCE - LIKING

Source	DF	Type III SS	F-Value	P > F
Between Subjects Effects				
Intercept	1	181.0534	24.72	0.0001
Covariate	1	129.7023	17.71	0.0001
Version	2	50.1938	3.43	0.0357
Order and Position	1	5.0247	0.69	0.4092
Version * Order	2	18.5099	1.26	0.2864
Error	120	878.9758		
Cell	2	18.6838	4.52	0.0250
Prod * Version	14	156.2446	5.39	0.0100
Error (Product)	960	1984.9216		
Cell * Order	2	0.1300	0.03	0.2500
Prod * Version * Order	14	27.1226	0.94	0.2500
Error (Product)	960	1984.9216		

Unity/Atypical and Non-unity/Atypical product versions was significant only for the refrigerator product $F(1,121 = 28.41, p < .0001)$. These results indicate that product appearance, and particularly unity, does influence subjects' attitudes toward products even when written attribute information (i. e., technical information) is available concerning the products.

The means for the quality ratings are presented in Table V-3 and the ANOVA for the effect of unity on subjects' perceptions of quality is presented in Table V-4. Although the pattern exhibited by the means is consistent with the prediction that the unity aspect of product appearance influences perceived quality, the effect of unity was not significant across products $F(2,984 = .22, p > .25)$, nor was the contrast between the mean for Unity/Atypical products

TABLE V - 3
QUALITY

Product	Unity/ typical	Non-Unity/ Atypical	Unity/ Atypical	U_N'
1. Bathroom scale	5.24	5.58	6.68	1.10
2. T. V. Remote	6.44	6.00	6.21	0.21
3. Flashlight	5.30	5.46	5.98	0.52
4. Lamp	6.91	5.19	5.83*a	0.64
5. Refrigerator	5.83	5.70***a	5.97	0.27**b
6. Telephone	6.05	5.44*	5.65***	0.21
7. Hair dryer	6.11	6.77*	5.44**	-1.33
8. Dresser	6.29	5.67	6.09	0.42
9. Clock	5.49	6.37	6.00	-0.37
Total	5.96	5.79	5.98	0.19

a Indicates significance from Prototypical product.

b Indicates significance of the differences between Unity/Atypical and Non-unity/Atypical conditions.

*** Indicates differences significant at $p < .001$.

** Indicates differences significant at $p < .01$.

* Indicates differences significant at $p < .05$.

+ Indicates differences significant at $p < .10$.

TABLE V - 4
ANALYSIS OF VARIANCE - QUALITY

Source	DF	Type III SS	F-Value	P > F
Between Subjects Effects				
Intercept	1	2.5064	0.68	0.4101
Covariate	1	474.7499	129.42	0.0001
Version	2	21.0677	2.87	0.0604
Order and Position	1	4.7474	1.29	0.2575
Version * Order	2	1.1033	0.15	0.8605
Error	123	451.1998		
Cell	2	0.6545	0.22	0.2500
Prod * Version	14	200.7009	9.85	0.0010
Error (Product)	984	1431.8646		
Cell * Order	2	0.3782	0.13	0.2500
Prod * Version * Order	14	47.7123	2.34	0.1000
Error (Product)	984	1431.8646		

($M = 5.98$) and the mean for Non-unity/Atypical products ($M = 5.79$) significant $F(1,123) = .24$, $p > .25$). Seven of the nine nonlinear unity scores were in the expected direction. Follow-up tests on the individual products indicated that the contrast between the Unity/Atypical and Non-unity/Atypical product versions was only significant for the refrigerator product $F(1,123 = 6.84$, $p < .01$).

Summary

It was predicted that the unity aspect of product appearance would influence subjects' attitudes towards products and their perceptions of product quality despite the availability of written attribute information. The results

presented here indicate that while this certainly does seem to be the case for attitudes toward products, the additional information seems to moderate the influence of product aesthetics (i. e., unity) on perceptions of product quality. As was pointed out in Chapter III, attitudes seem to be more closely linked (or more susceptible) to aesthetic responses than other derived responses such as quality. It may be that the more general nature of attitudes results in their being more inclusive and thus allows (consciously or unconsciously) aesthetic information to be weighted more heavily than it is in the case of derived responses that are more focused on specific product attributes.

CHAPTER VI GENERAL DISCUSSION

The results of these three studies provide strong evidence of the influence of unity on aesthetic responses. Unity was also shown to significantly influence attitudes toward products, perceived familiarity, and in some situations perceptions of product quality. The context of the evaluation situation (i. e., whether or not other product variations or written product descriptions were presented for comparison along with the product being evaluated) was shown to moderate the influence of unity (i. e., aesthetic response) on perceived quality. In addition to these insights concerning the influence of unity on aesthetic and derived responses, these studies help to clarify the role of prototypicality in influencing aesthetic and derived responses. Although prototypicality did seem to have a positive effect on aesthetic responses and attitudes toward products, it did not seem to have a positive effect on perceived quality or price expectations. In fact, prototypicality seemed to have a negative effect on price expectations.

In Experiment 1 a product's consistency with the unity visual organization principle was shown to significantly influence subjects' aesthetic responses toward products. The favorable aesthetic response generated by a

product's consistency with the unity visual organization principle carried over into subjects' attitudes toward products, perceptions of product quality, and product price expectations. In addition, unity was shown to influence subjects' perceptions of product familiarity. The effect of unity was quite robust as these results were replicated across nine product categories using three different types of product transformation. The results of Experiment 1 provide a clear indication that the unity visual organization principle is an important design factor that can significantly influence aesthetic responses and non-aesthetic product evaluations.

Experiment 2 found that unity significantly influenced aesthetic responses even when products were evaluated without the context of other product versions from the same product category. The favorable aesthetic response generated by consistency with the unity visual organization principle was also shown to carry over to attitudes toward products and perceived familiarity. Although the overall pattern of the means for the quality ratings of the products was positive for the majority of the stimulus sets tested, it was not significant. This experiment, which provided a between-subjects test of the influence of the unity and prototypicality factors, indicates that just as in Experiment 1 unity provides a better explanation of aesthetic response than does prototypicality. This between-subjects replication further demonstrates that the effects of unity are quite robust.

The "comparative context" (i. e., different product versions rated together) of Experiment 1 was similar to shopping situations where competitive product offerings in the same category are displayed together (e. g., electronics stores). This is also the case for products displayed in catalogs that feature goods made by more than one manufacturer. The majority of products seem to be displayed along with competitive product offerings and therefore are evaluated in comparative contexts. In this sense Experiment 1 would seem to be ecologically valid. However, most advertising and some products are evaluated under conditions similar to the "non-comparative" context employed in Experiment 2. The evaluative context in Experiment 2 was "non-comparative" in that product versions were evaluated singularly, without the benefit of other similar product versions as reference points. This is the case for most advertising. It is also the case for products such as automobiles, boats, furniture, etc. that often involve exclusive distribution networks. The evaluation contexts for these products is usually one where the consumer is not able to directly (i. e., side by side) compare competitive product offerings. With respect to these purchase situations Experiment 2 would seem to be ecologically valid.

The third experiment, which focused on derived responses, found that the unity aspect of product appearance influenced subjects' attitudes toward products despite the availability of information contained in product descriptions. This study involved a context that was similar to many everyday

shopping situations in that the products being evaluated were presented along with descriptive information. Even though subjects were allowed to evaluate the products in whatever manner that they wished, the aesthetic information (i. e., product appearance) clearly played a role in influencing their attitudes toward the products. The descriptive information did, however, seem to supersede aesthetic information with respect to perceived quality.

Across the three experiments the effects of unity were quite robust although they were more pronounced in the experiment that was conducted within-subjects than they were in the between-subjects experiments. This is not surprising since within-subjects designs afford more statistical power than do between-subjects designs. The fact that these effects were indicated despite the use of rather primitive line drawings suggests that the effects may be stronger in the real-world since a "greater range of perceptual salience can be achieved" through the use of color, materials, and three dimensions (Hutchinson and Alba 1991, p. 342). It is important to note that the effects of unity on derived responses that were observed in Experiments 1 and 2 could have been influenced by the procedure that was employed (i.e., having subjects rate the products on all five of the dependent measures).¹⁶ The fact that the patterns exhibited by each of the dependent variables were not the same (e. g., price) coupled with the fact that the effect of unity was observed in the

¹⁶ The direction of two of the rating scales was reversed in order to reduce response bias on the part of subjects.

third experiment in which subjects rated products on only one of the dependent measures would seem to suggest that the results are not merely an artifact of the procedure employed.

The findings concerning the effect of evaluation context on the influence of product aesthetics has some interesting managerial implications which are especially relevant to the design and marketing of new products. Experiment 3 seems to indicate that the context in which product evaluations occur (e. g., presence of competitive products, descriptive product information) can influence how heavily consumers weight aesthetic information (i. e., product appearance) in their product evaluations. This suggests that there may be a trade-off between the influence of descriptive information and product appearance in the promotion or merchandising of a product. If, for example, the addition of certain descriptive product information causes consumers to focus less on a very well designed product's appearance, then the net effect of adding the information may be a reduction in the total "impact" of the promotional effort. Depending on the goals (i. e., desired impact; e. g., increased sales, awareness, quality perceptions, etc.) of the promotion this could seriously affect the results of the campaign.

Experiments 1 and 2 suggest that context (i. e., the opportunity to compare a product version with other products in the same product category during the evaluation phase of the buying process) plays a role in mediating the influence of the aesthetic aspects of products. This suggests that managers

should pay particular attention to product design for products that will be evaluated in close proximity (either physically or in photographs) to competitors' products since the influence of aesthetic response is likely to play a role in affecting key product perceptions (e. g., beauty, quality). This could also be true for instances where consumers collect product brochures in order to "directly" compare products (e.g., automobile brochures). The findings of these studies also seem to suggest that in cases where a product is known to have a poor appearance an effort should be made to display it apart from other products that have more appealing designs. Such action would reduce the salience of the aesthetic aspects of the product.¹⁷

One interesting finding that would seem to have implications for the designing of new products concerns the relationship between novelty and price. The novel (i. e., atypical) products in Experiments 1 and 2 were associated with higher prices regardless of the level of unity that they exhibited. The association of higher priced products with the prototypicality of a product's appearance and the association of quality with the unity aspect of a product's design would seem to suggest that product appearance (i. e., design) can be used to position a product with respect to (seemingly) "non-aesthetic" dimensions (i. e., price, quality). The implication is that design could be used

17 This course of action is offered with great reservation. The best long-term course of action would be to redesign the product. However, in cases where a basically sound product has failed to achieve commercial success due to an initially poor design such a course of action may be warranted.

by a company to create an entire "line" of products that target different consumer segments at different price points, levels of quality, etc., while utilizing the same internal components. While this would be an extreme use (i. e., exploitation) of product design, the more likely and desirable use is to employ design to better communicate the nature (i. e., positioning and proper use) of a product to consumers.

An important issue to be investigated further is the relationship between unity and prototypicality. The findings of Experiments 1 and 2 indicated that consistency with the unity visual organization principle is positively related to perceived familiarity. One possible explanation for this is that there may be a natural tendency in people toward organization principles such as unity and symmetry. Whether the tendency of the viewer to look for organization and prefer it to chaos is innate or learned is still the subject of debate. The debate between biological and cultural determinism in aesthetics is but a small part of a larger ongoing debate on the relative roles of "nature" and "nurture" in human behavior. In all likelihood, the tendency to perceive visual elements in certain ways or as integrated wholes involves both biological and cultural influences. The natural tendency toward organization with respect to principles such as unity and symmetry may stem (at least in part) from our earliest encounters with ourselves and our environments (Johnson 1987). Our bodies (i. e., forms) and those of the animals and plants that we encounter exhibit the "regularities" that we have come to know as unity, symmetry,

balance, proportion, etc. Experience with these regularities would most certainly influence subsequent perception and over time become internalized. In this way people may develop a level of familiarity with and preference for certain relations (i. e., regularities; e. g., unity, symmetry). Goldstone, Medin, and Gentner (1991) have investigated how relational similarities (i. e., descriptions of connections between two or more objects or attributes; e. g., same color) affect similarity judgments. Their work shows that relations and attributes are psychologically distinct and that relations can significantly affect similarity judgments. Thus, relations (i. e., visual organization principles) which are learned (consciously or nonconsciously) would seem to have the potential to influence judgments of a product's prototypicality.

There is also a need for further investigation into the systematic nature of aesthetic response. This work as well as others (e. g., Veryzer 1993) indicates that the systematic nature of aesthetic response in the visual domain stems from the perceptual tendency toward organization. This tendency has been studied by the Gestalt psychologists and aestheticians and is the basis for general rules of perception such as the Gestalt laws (e. g., proximity, similarity) and design principles (e. g., unity, contrast, proportion). While the source of the visual organization principles (i. e., design principles, Gestalt laws) that operate to organize perception is still open to debate, there is evidence that the perception principles are present very early in life and that preferences related to these principles develop over time and may be modified

or influenced by cultural forces (Bornstein, Ferdinandsen, and Gross 1981; Segall 1976). Although the acquired principles are undoubtably modified from time to time, aesthetic response preference patterns are fairly stable within individuals over time (Huber and Holbrook 1981). Similarities and differences observed between individuals may be due to similarities or differences in the physical, socio-economic, or cultural environment in which people live.

Although on the surface it would seem that aesthetic response operates on a conscious level involving rational evaluation, it has been suggested that the intervening cognitive response system may operate below the threshold of consciousness at a subconscious or pre-conscious level (Holbrook and Hirschman 1982). Aesthetic response seems to operate on at least two levels - conscious awareness and nonconscious awareness (Holbrook and Hirschman 1982). The conscious level involves attending to the object and registering feelings or appreciation of the object. This level is the conscious registering of the unconscious input and is therefore primarily a function of the nonconscious awareness level (Zajonc 1980). The nonconscious level of awareness involves perceiving the object and determining its consistency with rules (e. g., design principles) which have been acquired. Regardless of whether these rules are innate or learned nonconsciously, they often seem to be applied without conscious awareness. Thus, while differences in the appearance of products may be readily perceived (i. e., conscious awareness), the underlying process

by which the differences are transformed into an aesthetic response often seems to occur nonconsciously.

The relationship between design principles and aesthetic response seems to develop, at least in part, through learning. While this learning process may be a formal one as in the case of educational programs for art and architecture, it often seems to be the result of an informal and nonconscious process. Thus, the phenomenon of aesthetic response may involve the nonconscious development of design principle internal processing algorithms (design principle IPAs) as well as the nonconscious application of these design principle algorithms. Objects (products) that are consistent with a person's design principle IPAs would be expected to produce more positive affect than objects that violate a person's relevant design principle IPAs (Veryzer 1993).

Another area that merits further investigation is the tendency of people to underweight the influence of product aesthetics on their evaluations of products. Berkowitz (1987) found evidence of the misattribution of product preferences by the perceivers of products. In a study that examined people's preferences for two food products, ratings on product attributes revealed that subjects did not attribute the reasons for their choices to visual appeal or more pleasing shape even though shape was the only actual difference between the two types of products. The fact that consumers attributed their preferences to other aspects such as "freshness" and "taste" even though shape was the only

difference between the two products raises questions about consumers' level of awareness concerning the influence of aesthetics on their product evaluations.

It is hoped that in addition to improving our understanding of the influence of aesthetics on consumer behavior the research that has been presented here will serve as a foundation for a theory of consumer aesthetics. This work takes an important step toward increasing our knowledge of the relationship between product aesthetics and consumer behavior. The goal of this research has been to investigate product aesthetics in a manner that yields the concrete principles governing people's responses to product designs. The theory and propositions concerning unity, prototypicality, and aesthetic response that were presented here lay a foundation for theorizing about the aesthetic aspects of product design. The results from the three studies indicate that there are, indeed, factors that systematically and significantly influence consumers' aesthetic responses and product perceptions. These findings provide empirical evidence that design is not simply a superficial, frivolous concern, but rather that it is an important variable that can have a significant impact on consumers' responses to products. This should encourage researchers and managers alike to pay more attention to design issues. It should also help to more firmly establish product design as a legitimate marketing interest.

APPENDIX A
PRODUCTS EXPLORED FOR USE AS STIMULI

APPENDIX A PRODUCTS EXPLORED FOR USE AS STIMULI

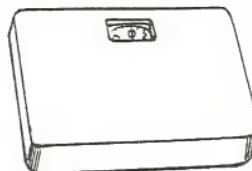
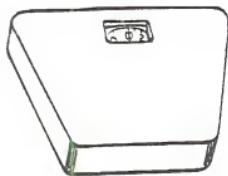
The products employed in the experiment were drawn from a larger set of stimuli that had been explored with respect to the proposed manipulations. Suitable stimuli can be created for virtually any product by manipulating two features of the product (e. g., shapes: circle/square; texture: smooth/rough; trim: present/absent; angle: 90-degree/60-degree). A partial list of products that have been explored with respect to the proposed manipulations includes the following:

Alarm clocks	Ice chests	Silverware
Calculators	Irons	Staplers
Cameras	Kitchen timers	Stereos
Clock radios	Lamps	Sunglasses
Coffee pots	Make-up compacts	Telephones
Cologne bottles	Mirrors	Thermoses
Cordless phones	Pencil sharpener	Toasters
Cups	Pots/pans	Toothbrushes
Dressers	Refrigerator	Television remote controls
Electric fans	Scissors	Televisions
Flashlights	Sewing machines	Vacuum cleaners
Glue guns	Shirts	Watches

APPENDIX B
STIMULUS SETS

Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

Bathroom scales



Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

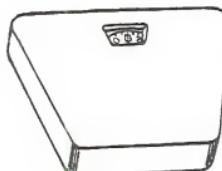
Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price



Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

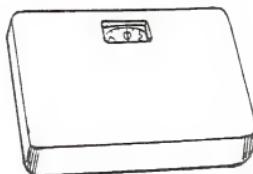
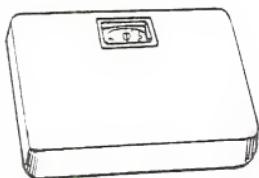
Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

Bathroom scales



Distinct 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

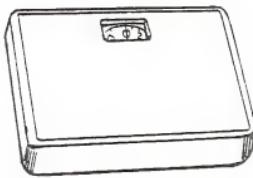
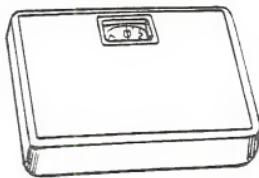
Distinct 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price



Distinct 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

Distinct 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

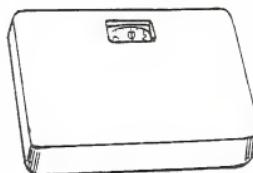
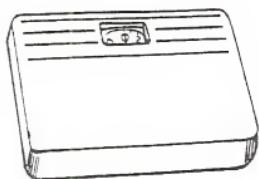
Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

Bathroom scales



Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

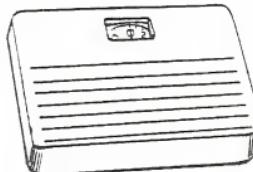
Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price



Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

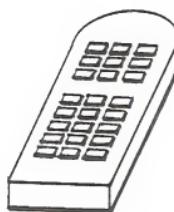
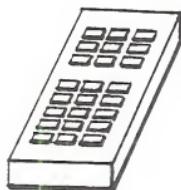
Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

TV Remote Controls



Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

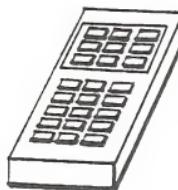
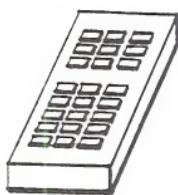


Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

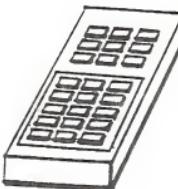
Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

TV Remote Controls



Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

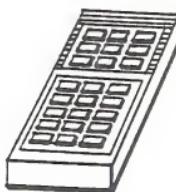
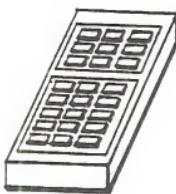


Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

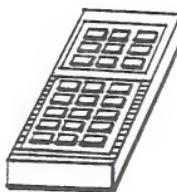
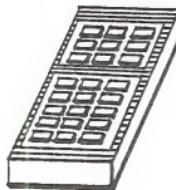
Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

TV Remote Controls



Disslike	1	2	3	4	5	6	7	8	9	Luke
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Disslike	1	2	3	4	5	6	7	8	9	Luke
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price



Disslike	1	2	3	4	5	6	7	8	9	Luke
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Disslike	1	2	3	4	5	6	7	8	9	Luke
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

Flashlights



Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price



Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

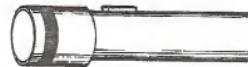
Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

Flashlights



Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price



Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

Flashlights



Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price



Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

Lamps



Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price



Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

Lamps



Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price



Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

Lamps



Dishlike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dishlike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

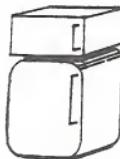
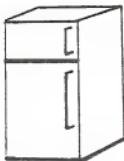


Dishlike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dishlike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

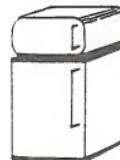
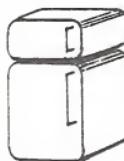
Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

Refrigerators



Dislike	1	2	3	4	5	6	7	8	9	Luke
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

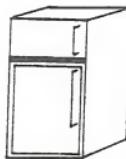
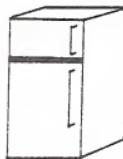


Dislike	1	2	3	4	5	6	7	8	9	Luke
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

Refrigerators



Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

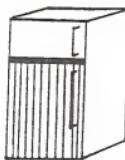
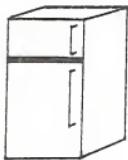
Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

Refrigerators



Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

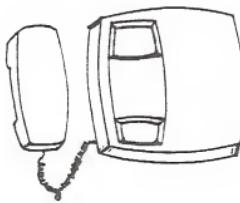
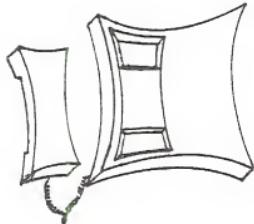


Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

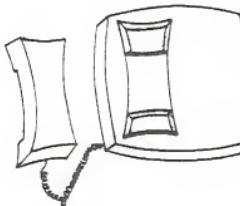
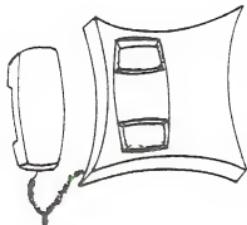
Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

Telephones



Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

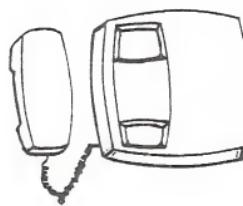


Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

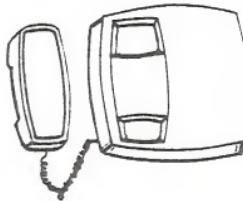
Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

Telephones



Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

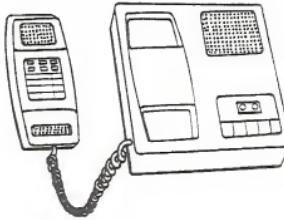
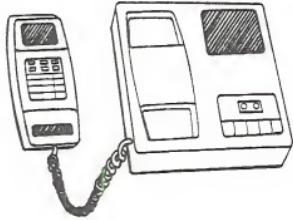


Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

Telephones



Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

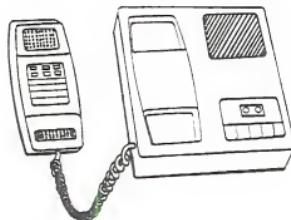
Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price



Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

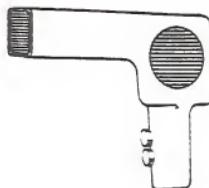
Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

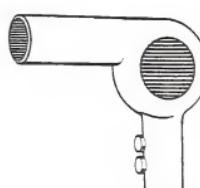
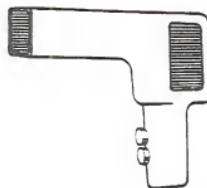
Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

Hair-dryers



Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

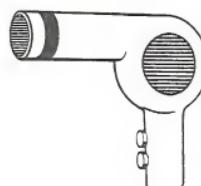
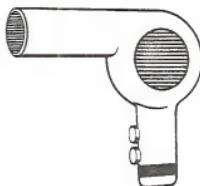


Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

Hair-dryers



Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price



Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

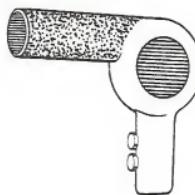
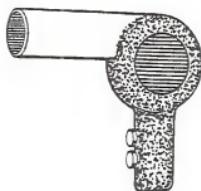
Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

Hair-dryers



Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

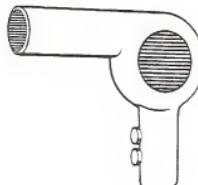
Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price



Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

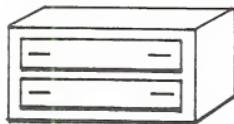
Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

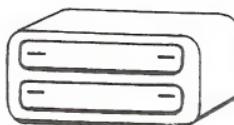
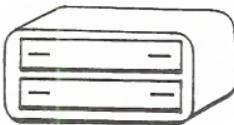
Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

Dressers (chest of drawers)



Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

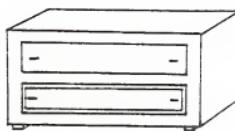
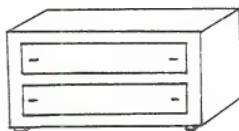


Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

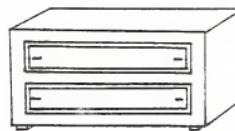
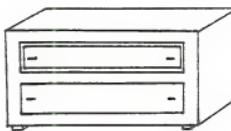
Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

Dressers (chest of drawers)



Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

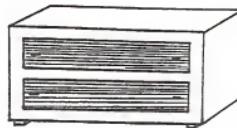
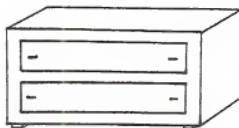


Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

Dressers (chest of drawers)



Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

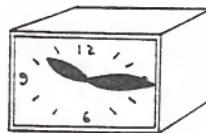
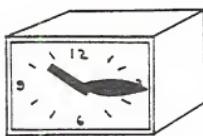


Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

Clocks



Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

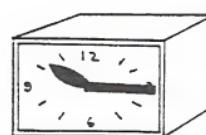
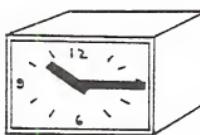
Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price



Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

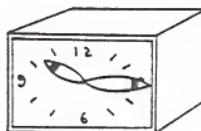
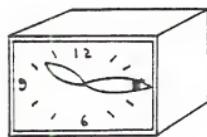
Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

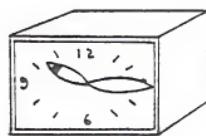
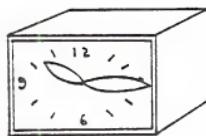
Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

Clocks



Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Lake
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

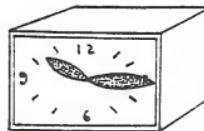
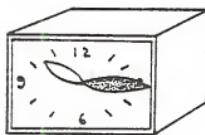


Dislike	1	2	3	4	5	6	7	8	9	Like
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Dislike	1	2	3	4	5	6	7	8	9	Lake
Ugly	1	2	3	4	5	6	7	8	9	Beautiful
Familiar	1	2	3	4	5	6	7	8	9	Unfamiliar
High Quality	1	2	3	4	5	6	7	8	9	Low Quality
Low Price	1	2	3	4	5	6	7	8	9	High Price

Please indicate your reaction to the appearance of the proposed products by marking (circling) the scales below each.

Clocks



Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

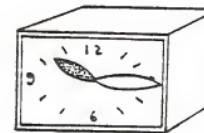
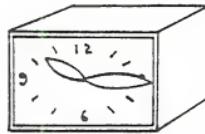
Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price



Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

Dislike 1 2 3 4 5 6 7 8 9 Like

Ugly 1 2 3 4 5 6 7 8 9 Beautiful

Familiar 1 2 3 4 5 6 7 8 9 Unfamiliar

High Quality 1 2 3 4 5 6 7 8 9 Low Quality

Low Price 1 2 3 4 5 6 7 8 9 High Price

APPENDIX C
DIAGRAM OF EXPERIMENT 1

TABLE C-1
DIAGRAM OF EXPERIMENT 1

	Bathroom Scale	TV Remote	Flash-Light	Lamp	Refrigerator	Telephone	Hair-dryer	Dresser	Clock
Version 1	Sh	Tx	Sh	Tr	Tx	Tr	Sh	Tx	Tr
Version 2	Tr	Sh	Tr	Tx	Sh	Tx	Tr	Sh	Tx
Version 3	Tx	Tr	Tx	Sh	Tr	Sh	Tx	Tr	Sh

Sh = Shape Transformation

Tr = Trim Transformation

Tx = Texture Transformation

Note: The order in which the stimulus sets were presented was reversed for half of the subjects.

APPENDIX D
DIAGRAM OF EXPERIMENT 2

TABLE D-1
DIAGRAM OF EXPERIMENT 2

	TV Remote	Flash- light	Lamp	Refrig- erator	Tele- phone	Hair- dryer	Dresser	Clock
Questionnaire Version 1	(++)	(+)	(-)	(--)	(++)	(+)	(-)	(-)
Questionnaire Version 2	(+)	(++)	(-)	(+)	(-)	(++)	(-)	(+)
Questionnaire Version 3	(+)	(-)	(++)	(+)	(-)	(-)	(++)	(-)
Questionnaire Version 4	(-)	(+)	(+)	(++)	(-)	(-)	(+)	(++)

APPENDIX E
PRODUCT DESCRIPTIONS USED IN EXPERIMENT 3

APPENDIX E
PRODUCT DESCRIPTIONS FOR EXPERIMENT 3

<u>"Strong"</u>	<u>"Weak"</u>
Bathroom Scales: *5 Year Warranty *Maximum Weight 330 lbs. *Easy to Read Dial *5 lbs.	Bathroom Scales: *3 Year Warranty *Maximum Weight 320 lbs. *Easy to Read Dial *5 lbs.
TV Remote Control *Controls 8 devices (TV, VCR, Cable, CD, Satellite, and 3 auxiliaries) *Performs all functions of the original remote control *On screen Programming Keys *Uses 4 AAA Batteries	TV Remote Control: *Controls 6 devices (TV, VCR, Cable, CD, and 2 auxiliaries) *Performs all functions of the original remote control *On screen Programming Keys *Uses 4 AAA Batteries
Flashlight: *Adjustable Beam (from spot to flood) *Lifetime Warranty *Uses 2-D Batteries *Waterproof	Flashlight: *Dual Reflector System *3 Year Warranty *Uses 2-D Batteries *Waterproof
Lamp: *2 way switch (high/low) *Uses up to 100 watt bulb *Flexible Gooseneck *Weighted (desktop base)	Lamp: *Rotary on/off switch *Uses up to 100 watt bulb *Flexible Gooseneck *Weighted (desktop base)
Refrigerator: *21.6 cu. ft. *Freezer has Removable shelf *Frostless *Energy Efficient *6 Storage compartments *2 Door Shelves	Refrigerator: *20 cu. ft. *Frostless *Energy Efficient *6 Storage compartments *2 Door Shelves

APPENDIX E -- continued

<u>"Strong"</u>	<u>"Weak"</u>
<p>Telephone:</p> <ul style="list-style-type: none"> *10 Number Memory *Receiver and Ringer volume control *Mute and Redial Buttons *3 lbs. 	<p>Telephone:</p> <ul style="list-style-type: none"> *6 Number Memory *Receiver and Ringer volume control *Mute and Redial *3 lbs.
<p>Hair dryer:</p> <ul style="list-style-type: none"> *1,600 watts *2 speeds and 3 heat settings *Dual Voltage *Super-quiet operation *2 lbs. 	<p>Hair dryer:</p> <ul style="list-style-type: none"> *1,500 watts *2 speeds and 2 heat settings *Dual Voltage *Super-quiet operation *2 lbs.
<p>Dresser:</p> <ul style="list-style-type: none"> *2 Spacious Drawers *Drawers have steel slides with ball bearings for smooth operation *Durable chip-resistant finish *Hardwood Back 	<p>Dresser:</p> <ul style="list-style-type: none"> *2 Spacious Drawers *Metal on wood Drawer guide *Durable chip resistant finish *Hardwood Back
<p>Clock:</p> <ul style="list-style-type: none"> *Illuminated Dial (2 brightness settings) *Snooze Button *Adjustable soft/loud Alarm *9 v Battery Backup 	<p>Clock:</p> <ul style="list-style-type: none"> *Illuminated Dial *Snooze Button *Adjustable soft/loud Alarm *9 v Battery Backup

REFERENCE LIST

- Ajzen, Icek (1989), "Attitude Structure and Behavior," in Attitude Structure and Function, eds. Anthony R. Pratkanis, Steven J. Breckler, and Anthony G. Greenwald, Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers, pp. 241-274.
- Auld, Frank (1981), "A Theory Deriving Preference from Conflict," in Advances in Intrinsic Motivation and Aesthetics, ed. Hy I. Day, New York: Plenum Press, pp. 203-224.
- Bell, Stephen S., Morris B. Holbrook, and Michael R. Solomon (1991), "Combining Esthetic and Social Value to Explain Preferences for Product Styles with the Incorporation of Personality and Ensemble Effects," The Journal of Social Behavior and Personality, Vol. 6, No. 6, pp. 243-273.
- Berkowitz, Marvin (1987), "The Influence of Shape on Product Preferences," Advances in Consumer Research, Vol. 14, p. 559.
- Berlyne, D. E. (1970), "Novelty, Complexity, and Hedonic Value," Perception and Psychophysics, Vol. 8, pp. 279-286.
- Berlyne, D. E. (1971), Aesthetics and Psychology, New York: Appleton-Century-Crofts.
- Berlyne, D.E. (1974), Studies in the New Experimental Aesthetics, New York: John Wiley and Sons.
- Bornstein, Marc H., Kay Ferdinandsen, and Charles G. Gross (1981), "Perception of Symmetry in Infancy," Developmental Psychology, Vol. 17, No. 1, pp. 82-86.
- Carruthers, Margaret (1970), "Color-Form Dominance and Memory for Color," M. A. thesis, Psychology Dept., University of Glasgow.
- Ching, Francis D. K. (1979), Architecture: Form, Space, and Order, New York: Van Nostrand Reinhold Company.

- Cohen, J (1977), Statistical Power Analysis for the Behavioral Sciences, (Rev. ed.), New York: Academic Press, 1977.
- Dickson, Peter R. and James L. Ginter (1987), "Market Segmentation, Product Differentiation, and Marketing Strategy," Journal of Marketing, (April), pp. 1-10.
- Edwards, Kari (1990), "The Interplay of Affect and Cognition in Attitude Formation and Change," Journal of Personality and Social Psychology, Vol. 59, pp. 202-216.
- Eisenman, R. (1968), "Novelty Ratings of Simple and Complex Shapes," Journal of General Psychology, 78, pp. 275-278.
- Garvin, David A. (1984), "What Does "Product Quality" Really Mean?" Sloan Management Review, (Fall), pp. 25-43.
- Glass, Lewis A. and Keith J. Holyoak (1986), Cognition, Second ed., New York, N.Y.: Random House.
- Goldstone, Robert L., Douglas L. Medin, and Dedre Gentner (1991), "Relational Similarity and the Nonindependence of Features in Similarity Judgements," Cognitive Psychology, Vol. 23, pp. 222-262.
- Gorski, D. (1987), The Cognitive Condition of Design, ed. Brian Zaff, Symposium Proceedings (March) 1987.
- Gruenwald, George (1985), New Product Development: What Really Works, Chicago, IL: Crain Books.
- Hartmann, George W. (1935), Gestalt Psychology: A Survey of Facts and Principles, New York: The Ronald Press Company.
- Holbrook, Morris B. (1981), "Introduction: The Esthetic Imperative in Consumer Research," in Symbolic Consumer Behavior, eds. Elizabeth C. Hirschman and Morris B. Holbrook, Ann Arbor, MI: Association for Consumer Research, pp. 36-37.
- Holbrook, Morris and Elizabeth Hirschman (1982), "The Experiential Aspects of Consumption: Consumer Fantasies, Feelings, and Fun," Journal of Consumer Research, Vol. 9 (2), pp. 132-140.

- Holbrook, Morris B. and Robert B. Zirlin (1985), "Artistic Creation, Artworks, and Aesthetic Appreciation: Some Philosophical Contributions to Non-profit Marketing," Advances in Nonprofit Marketing, Vol. 1, pp. 1-54.
- Holt, S. (1985), "Design, the Ninth Principle of Excellence: The Product Half of the Business Equation," Innovation, (Fall), pp. 2-4.
- Huber, Joel, and Morris B. Holbrook (1981), "The Use of Real Versus Artificial Stimuli in Research on Visual Esthetic Judgements," in Symbolic Consumer Behavior, eds. Elizabeth C. Hirschman and Morris B. Holbrook, Ann Arbor, MI: Association for Consumer Research, pp. 60-68.
- Hutcheson, F. (1725), An Inquiry into the Original of Our Ideas of Beauty and Virtue, London: Darby.
- Hutchinson, J. Wesley and Joseph W. Alba (1991), "Ignoring Irrelevant Information: Situational Determinants of Consumer Learning," Journal of Consumer Research, Vol. 18, (December), pp. 325-345.
- Johnson, Mark (1987), The Body in the Mind, Chicago: The University of Chicago Press.
- Katz, David (1950), Gestalt Psychology, New York: The Ronald Press Company.
- Keppel, Geoggrey (1991), Design and Analysis: A Researcher's Handbook, 3rd ed., Englewood Cliffs, NJ: Prentice-Hall, Inc.
- Koffka, K. (1935), Principles of Gestalt Psychology, New York: Harcourt, Brace and Company.
- Kohler, Wolfgang (1929), Gestalt Psychology: An Introduction to New Concepts in Modern Psychology, New York: Liveright Publishing Corporation (1947).
- Kotler, Philip and G. Alexander Rath (1984), "Design: A Powerful But Neglected Strategic Tool," The Journal of Business Strategy, Vol. 5 (Fall), pp. 16-21.
- Kunst-Wilson, W. R. and R. B. Zajonc (1980), "Affective Discrimination of Stimuli That Cannot Be Recognized," Science, Vol. 207, pp. 557-558.

- Landy, David and Harold Sigall (1974), "Beauty Is Talent: Task Evaluation as a Function of the Performer's Physical Attractiveness," Journal of Personality and Social Psychology, Vol. 29, pp. 299-304.
- Langlois, Judith H. and Lori A. Roggman (1990), "Attractive Faces Are Only Average," Psychological Science, Vol. 1, No. 2, March, pp. 115-121.
- Lauer, David A. (1979), Design Basics, New York: Holt, Rinehart, and Winston.
- Lennon, Sharron J. (1990), "Effects of Clothing Attractiveness on Perceptions," Home Economics Research Journal, Vol. 18, pp. 303-310.
- Lewalski, Z. (1988), Products Esthetics: An Interpretation for Designers, Carson City, New York: Design and Development Engineering Press.
- Lewicki, Pawel (1986), Nonconscious Social Information Processing, New York: Academic Press.
- Loken, Barbara and James Ward (1990), "Alternative Approaches to Understanding the Determinants of Typicality," Journal of Consumer Research, Vol. 17, pp. 111-126.
- Lorenz, Christopher (1986), The Design Dimension, New York, NY: Basil Blackwell Inc.
- Mandler, George (1982), "The Structure of Value: Accounting for Taste," in Affect and Cognition: The 17th Annual Carnegie Symposium, eds. Margaret S. Clark and Susan T. Fiske, Hillsdale, NJ: Lawrence Erlbaum Associates, pp. 3-36.
- Meyers-Levy, Joan and Alice M. Tybout (1989), "Schema Congruity as a Basis for Product Evaluation," Journal for Consumer Research, Vol. 16 (June), pp. 39-54.
- Monroe, Kent B. (1973), "Buyers' Subjective Perceptions of Price," Journal of Marketing Research, Vol. 8, February, pp. 70-80.
- Mothersill, Mary (1989), "Aesthetic Laws, Principles and Properties: A Response to Eddy Zemach," The Journal of Aesthetics and Art Criticism, Vol. 47, No. 1 (Winter), pp. 77-82.

- Nedungadi, Prakash and J. Wesley Hutchinson (1985), "The Prototypicality of Brands: Relationships with Brand Awareness, Preference and Usage," in Advances in Consumer Research, eds. Elizabeth C. Hirschman and Morris Holbrook, Provo UT: Association for Consumer Research, Vol. 12, pp. 498-503.
- Nisbett, Richard E. and Timothy DeCamp Wilson (1977), "Telling More Than We Can Know: Verbal Reports on Mental Processes," Psychological Review, Vol. 84 (May), pp. 231-259.
- Nunnally, Jum C. (1981), "Explorations of Exploration," in Advances in Intrinsic Motivation and Aesthetics, ed., Hy I. Day, New York: Plenum Press, pp. 87-130.
- Nussbaum, Bruce (1991), "Winners: The Best Product Designs of the Year," in Business Week, June 17, 1991, pp. 62-80.
- Oakley, Mark (1990), "Design and Design Management," in Design Management: A Handbook of Issues and Methods, ed. Mark Oakley, Cambridge, MA: Basil Blackwell Inc., pp. 3-14.
- Olson, Jerry C. (1981), "What is an Esthetic Response?" Symbolic Consumer Behavior, eds. Elizabeth C. Hirschman and Morris B. Holbrook, Ann Arbor, MI: Association for Consumer Research, pp. 71-74.
- Patzer, G. L. (1985), The Physical Attractiveness Phenomena, New York: Plenum Press.
- Pickford, R. W. (1972), Psychology and Visual Aesthetics, London: Hutchinson Educational Ltd., (Distributed in the U. S. by Crane, Russak and Co. Inc., New York, N. Y.).
- Pleydell-Pearce, A.G. (1970), "Objectivity and Value in the Judgements of Aesthetics," The British Journal of Aesthetics, Vol. 10, No. 1, pp. 25-38.
- Pye, David (1978), The Nature and Aesthetics of Design, New York: Van Nostrand Reinhold Company.
- Reed, J. D. (1990), "The New Shape of Sound," in Time, August 27, 1990, p. 58.
- Rosch, E. (1978), "Principles of Categorization," in E. Rosch and B. B. Lloyd (Eds.), Cognition and Categorization, Hillsdale, NJ: Erlbaum, pp. 27-47.

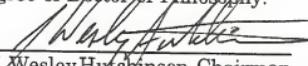
- Segall, Marshall H. (1976), "Visual Art: Some Perspectives from Cross-Cultural Psychology," in Beyond Aesthetics: Investigations into the Nature of Visual Art, ed. Don Brothwell, Thames and Hudson: London, 1976.
- Sproles, George B. (1981), "Analyzing Fashion Life Cycles - Principles and Perspectives," Journal of Marketing, Vol. 45 (Fall), pp. 116-124.
- Urban, Glen L. and John R. Hauser (1993), Design and Marketing of New Products, Englewood Cliffs, NJ: Prentice-Hall, Inc.
- Veryzer, Robert W. (1993), "Aesthetic Response and the Influence of Design Principles on Product Preferences," in Advances in Consumer Research, eds., Leigh McAlister and Michael L. Rothschild, Provo, UT: Association of Consumer Research, Vol. 20, pp. 224-228.
- Wallendorf, Melanie (1980), "The Formation of Aesthetic Criteria Through Social Structures and Social Institutions," in Advances in Consumer Research, ed., Jerry C. Olson, Ann Arbor, MI: Association for Consumer Research, Vol. 7, pp. 3-6.
- Whitney, Daniel E. (1988), "Manufacturing by Design," Harvard Business Review, (July-August), pp.83-90.
- Wilkie, William L. (1990), Consumer Behavior, 2nd ed., New York: John Wiley and Sons.
- Wohlwill, Joachim F. (1981), 'A Conceptual Analysis of Exploratory Behavior: The "Specific-Diverse" Distinction Revisited,' in Advances in Intrinsic Motivation and Aesthetics, ed. Hy I. Day, New York: Plenum Press, pp. 341-364.
- Winer, B. J., Donald R. Brown, and Kenneth M. Michels (1991), Statistical Principles in Experimental Design, New York, NY: McGraw-Hill, Inc.
- Woll, Stanley and Arthur Graesser (1982), "Memory Discrimination for Information typical and Atypical of Person Schemata," Social Cognition, Vol. 1, No. 42, pp. 287-310.
- Zaff, Brian S. (1987), The Cognitive Condition of Design, ed. Brian S. Zaff, Symposium Proceedings (March), 1987.
- Zajonc, R. B. (1980), "Feeling and Thinking: Preferences Need No Inferences," American Psychologist, 35, pp. 151-175.

Zeithaml, Valarie A. (1988), "Consumer Perceptions of Price, Quality, and Value: A Means-End Model and Synthesis of Evidence," Journal of Marketing, Vol. 52, pp. 2-22.

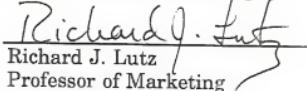
BIOGRAPHICAL SKETCH

Robert Whitman Veryzer, Jr. is the third of four sons born to Robert and Marion Veryzer. He attended Birmingham Seaholm High School in Birmingham, Michigan. From 1979 to 1983 Robert attended Olivet College where he was the recipient of the Olivet College Presidential Scholarship and was graduated with honors. After working for a year for a small manufacturing company, he left to pursue a Master of Business Administration degree in marketing at Michigan State University. In addition to his studies, Robert worked for the State of Michigan as a marketing assistant and later for General Motors Corporation-Oldsmobile Product Planning Department as a product research analyst. After completing his M. B. A. degree, he spent one semester conducting an independent research project that involved examining the role of product design in business. Robert then went to work for General Foods Corporation as an assistant product manager. In the Fall of 1989, he entered the Ph.D. program in marketing at the University of Florida. Robert has accepted an offer to join the faculty of Rensselaer Polytechnic Institute.

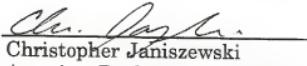
I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.


J. Wesley Hutchinson, Chairman
Associate Professor of Marketing

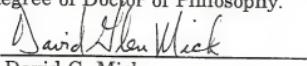
I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.


Richard J. Lutz
Professor of Marketing

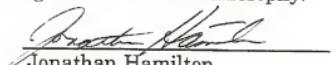
I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.


Christopher Janiszewski
Associate Professor of Marketing

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.


David G. Mick
Assistant Professor of Marketing

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.


Jonathan Hamilton
Associate Professor of Economics

This dissertation was submitted to the Graduate Faculty of the Department of Marketing in the College of Business Administration and to the Graduate School and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

August, 1993


Dean, Graduate School